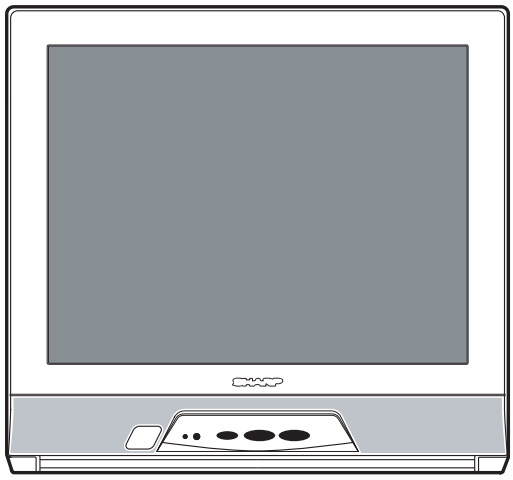
SHARP SERVICE MANUAL

TVSM045-21V-R70M



COLOR TELEVISION

Chassis No. GA-4M

MODEL 21V-R70M

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

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ELECTRICAL SPECIFICATIONS

POWER INPUT ..... 110-230 V AC,50/60 Hz

POWER RATING ..... 82 W

PICTURE SIZE ..... 1,240 cm^2 (192sq inch)

CONVERGENCE ..... Magnetic

SWEEP DEFLECTION ..... Magnetic

FOCUS ..... Hi-Bi-Potential Electrostatic

INTERMEDIATE FREQUENCIES

- Picture IF Carrier Frequency ..... 45.75 MHz
- Sound IF Carrier Frequency ..... 41.25 MHz
- Color Sub-Carrier Frequency ..... 42.17 MHz (Nominal)

AUDIO POWER OUTPUT RATING ..... 3 W

SPEAKER

- SIZE ..... 9 cm x 5 cm

VOICE COIL IMPEDANCE ..... 16 ohm at 400 Hz

ANTENNA INPUT IMPEDANCE

- VHF/UHF .....75 ohm Unbalanced

TUNING RANGES

- VHF-Channels ..... 2 thru 13
- UHF-Channels ..... 14 thru 69
- CATV Channels ..... 1 thru 125

Specifications are subject to change without prior notice.

SHARP (PHILS.) CORPORATION

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IMPORTANT SERVICE SAFETY PRECAUTION

● Service work should be performed only by qualified service technicians who are thoroughly familiar will all safety checks and the servicing guidelines which follow:

WARNING

1. For continued safety, no modification of any circuit should be attempted.
2. Disconnect AC power before servicing.
3. Semiconductor heat sinks are potential shock hazards when the chassis is operating.
4. The chassis in this receiver has two ground systems which are separated by insulating material. The non-isolated (hot) ground system is for the B+ voltage regulator circuit and the horizontal output circuit. The isolated ground system is for the low B+ DC voltages and the secondary circuit of the high voltage transformer.
   To prevent electrical shock use an isolation transformer between the line cord and power receptacle, when servicing this chassis.

SERVICING OF HIGH VOLTAGE SYSTEM AND PICTURE TUBE

When servicing the high voltage system, remove the static charge by connecting a 10k ohm resistor in series with an insulated wire (suc h as a test pr obe) between the picture tube gr ound and the anode lead. (AC line cord should be connected from AC outlet.)

1. Picture tube in this receiver employs integral implosion protection.
2. Replace with tube of the same type number for continued safety.
3. Do not lift picture tube by the neck.
4. Handle the picture tube only when wearing shatterproof goggles and after discharging the high voltage anode completely.

X-RADIATION AND HIGH VOLTAGE LIMITS

1. Be sure all service personnel are aware of the procedures and instructions covering X-radiation. The only potential source of X-ray in current solid state TV receivers is the picture tube. However, the picture tube does not emit measurable X-Ray radiation, if the high voltage is as specified in the "High Voltage Check" instructions.
   It is only when high voltage is excessive that X-radiation is capable of penetrating the shell of the picture tube including the lead in the glass material. The important precaution is to keep the high voltage below the maximum level specified.
2. It is essential that servicemen have available at all times an accurate high voltage meter.
   The calibration of this meter should be checked periodically.
3. High voltage should always be kept at the rated value - no higher. Operation at higher voltages may cause a failure of the picture tube or high voltage circuitry and;also, under certain conditions, may produce radiation in exceeding of desirable levels.
4. When the high voltage regulator is operating properly there is no possibility of an X-radiation problem. Every time a color chassis is serviced, the brightness should be tested while monitoring the high voltage with a meter to be certain that the high voltage does not exceed the specified value and that it is regulating correctly.
5. Do not use a picture tube other than that specified or make unrecommended circuit modifications to the high voltage circuitry.
6. When trouble shooting and taking test measurements on a receiver with excessive high voltage, avoid being unnecessarily close to the receiver.
   Do not operate the receiver longer than is necessary to locate the cause of excessive voltage.

IMPORTANT SERVICE SAFETY PRECAUTION

(Continued)

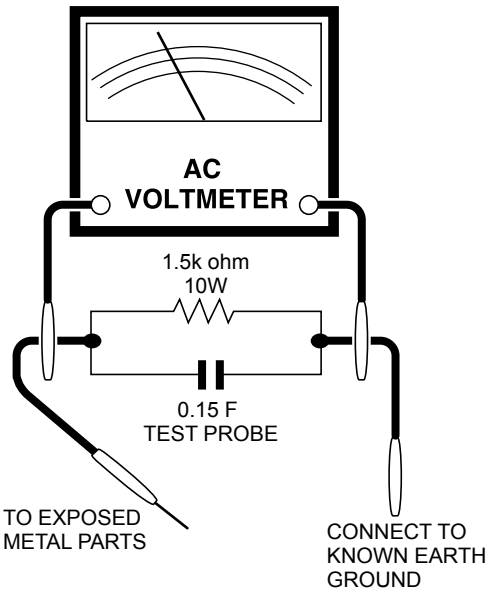
BEFORE RETURNING THE RECEIVER

(Fire & Shock Hazard)

Before returning the receiver to the user, perform the following safety checks.

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the receiver.
2. Inspect all protective devices such as non-metallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc.
3. To be sure that no shock hazard exists, check for leakage current in the following manner.

- Plug the AC cord directly into a 110~230 volt AC outlet, (Do not use an isolation transformer for this test).
- Using two clip leads, connect a 1.5k ohm, 10 watt resistor paralleled by a 0.15uF capacitor in series with all exposed metal cabinet parts and a known earth ground, such as electrical conduit or electrical ground connected to earth ground.
- Use an AC voltmeter having with 5000 ohm per volt, or higher, sensitivity to measure the AC voltage drop across the resistor.
- Connect the resistor connection to all exposed metal parts having a return to the chassis (antenna, metal cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor.
  All checks must be repeated with the AC line cord plug connection reversed. (If necessary, a non-polarized adapter plug must be used only for the purpose of completing these check.)
  Any current measured must not exceed 0.5 milliamp. Any measurements not within the limits outlined above indicate of a potential shock hazard and corrective action must be taken before returning the instrument to the customer.



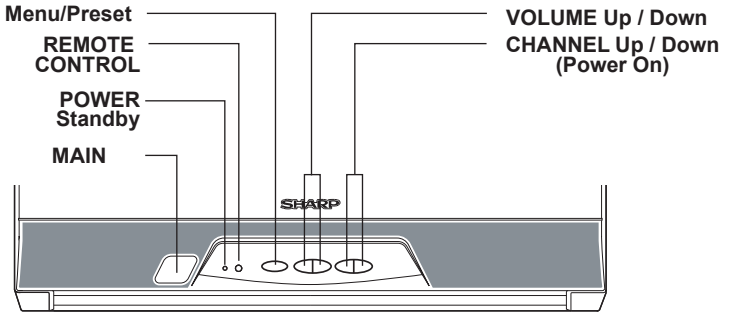
SAFETY NOTICE

Many electrical and mechanical parts in television receivers have special safety-related characteristics. These characteristics are often not evident from visual inspection, nor can protection afforded by them be necessarily increased by using replacement components rated for higher voltage, wattage, etc.
Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by "⚠" and shaded areas in the Replacement Parts Lists and Schematic Diagrams.

For continued protection, replacement parts must be identical to those used in the original circuit. The use of substitute replacement parts which do not have the same safety characteristics as the factory recommended replacement parts shown in this service manual, may create shock, fire, X-radiation or other hazards.

LOCATION OF USER'S CONTROL

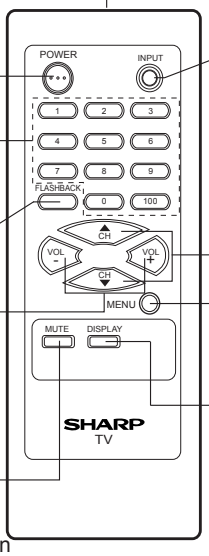
Front Panel



Note: Appearance design may vary depending on models ;

Basic Remote Control Functions

REMOTE CONTROL



POWER
Press → ON.
Press again → OFF.

REMOTE KEYPAD
Accesses any channel from keypad.

FLASHBACK
Returns to previous channel.

VOLUME UP / DOWN
(+) Increases sound.
(–) Decreases sound.
● In menu mode, changes or selects the TV adjustments.

MUTE
Press → Mute sound.
Press again → Restores sound.
● CLOSED CAPTION appears when sound is muted.

INPUT
Press Switch to external video INPUT 1 mode.
Press 2 times Switch to external video INPUT 2 mode.
Press 3 times Switch back to the original TV mode.

CHANNEL UP / DOWN
(▲) Selects next higher channel.
(▼) Selects next lower channel presetting.

MENU
Press → Accesses MAIN MENU.
Press again → Exits MAIN MENU.

DISPLAY
Press → Displays receiving channel for four seconds.
Press again → Removes display.
● Temporarily displays receiving channel when in Closed Caption mode.

INSTALLATION AND SERVICE INSTRUCTIONS

Note: (1) When performing any adjustments to resistor controls and transformers, use non-mettalic screw drivers or TV alignment tools.
(2) Before performing adjustments, the TV set must be on at least 15 minutes.

CIRCUIT PROTECTION

The receiver is protected by a 3.15A fuse (F701), mounted on PWB-A, wired into one side of the A C line input.

X-RADIATION PROTECTOR CIRCUIT TEST

After ser vice has been perf ormed on the horizontal deflection system, high v olta ge system, B+ system, test the X-Radiation pr otection cir cuit to ascer tain proper operation as f ollo ws:

1. Apply 110~230V AC using a variac transformer for accurate input voltage.
2. Allow for warm up and adjust all customer controls for normal picture and sound.
3. Receive a good local channel.
4. Connect a digital voltmeter to TP653 and make sure that the voltmeter reads 26 ±1.1V.
5. Apply external 27V DC at TP653 by using an external DC supply, TV must be shut off.
6. To reset the protector, unplug the AC cord and make a short circuit between TP651 and TP652. Now make sure that normal picture appears on the screen.
7. If the operation of the horizontal oscillator does not stop in step 5, the circuit must be repaired before the set is returned to the customer.

HIGH VOLTAGE CHECK

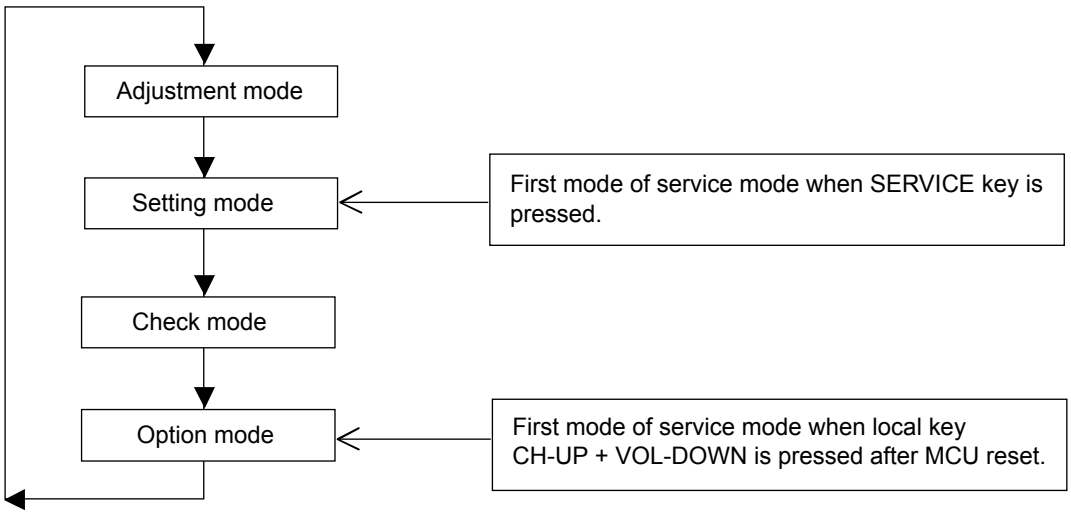
High v oltage is not adjustab le but m ust be c hecked to verify that the receiver is operating within safe and efficient design limitations as specified checks should be as follows:

1. Connect an accurate high voltage meter between ground and anode of picture tube.
2. Operate receiver for at least 15 minutes at 110~230V AC line voltage, with a strong air signal or a properly tuned in test signal.
3. Enter the service mode and set Y-mute ON by using Service R/C.
4. The voltage should be approximately 28.5 kV (at zero beam).
   If a correct reading cannot be obtained, check circuitry for malfunctioning components. After the voltage test, make Y-mute off to the normal mode.

SERVICE MODE

Service Mode Overview

1. Service mode is entered by SERVICE key input or CH-UP +VOL-DOWN input during reset.
2. Service mode is cleared by entering SERVICE key command during service mode.
3. If key input port (SERVICE) input is LOW, then it is in service mode.
4. During key input port (SERVICE) input is LOW, clearing service mode by key input SERVICE is disabled.
5. Service mode can be switched to 4 modes as follows by key input MENU;


Adjustment mode
Setting mode
First mode of service mode when SERVICE key is pressed.
Check mode
Option mode
First mode of service mode when local key
CH-UP + VOL-DOWN is pressed after MCU reset.

6. AFT processing is disabled during service mode. PLL setting data is set to fo data.
7. All user data are set to default during service mode. FAO and SPEAKER user settings are off and on respectively in service mode. Energy Save is off.
8. Sleep timer, View timer, on timer and off timer are inactivated in Service mode.
9. Sound is muting in service mode except at Adjustment Items V20, M01, M03, M04, M05, and M06.

Adjustment Mode Items

No.	Item Name	IC	Register	Range	Default
V01	SUB-PICTURE	1 Chip	CONTRAST	0~127	127
V02	SUB-TINT	1 Chip	TINT	0~127	64
V03	SUB-COLOR	1 Chip	COLOR	0~127	64
V04	SUB-BRIGHT	1 Chip	BRIGHT	0~255	128
V05	SUB-SHARP	1 Chip	VIDEO-TONE	0~63	43
V06	V-SHIFT	1 Chip	V-SHIFT	0~7	4
V07	H-SHIFT	1 Chip	H-PHASE	0~31	16
V08	RF-AGC	1 Chip	RF-DELAY	0~127	127
V09	V-SIZE	1 Chip	V-SIZE	0~63	32
V10	PIF-VCO	1 Chip	VIF-VCO	0~63	32
V11	R-CUTOFF	1 Chip	R-CUTOFF	0~255	127
V12	G-CUTOFF	1 Chip	G-CUTOFF	0~255	127
V13	B-CUTOFF	1 Chip	B-CUTOFF	0~255	127
V14	R-DRIVE	1 Chip	R-DRIVE	0~127	64
V15	B-DRIVE	1 Chip	B-DRIVE	0~127	64
V16	SUB-COLOR(YUV)	1 Chip	COLOR	0~127	64
V17	SUB-TINT(YUV)	1 Chip	BASEBAND-TINT	0~127	64
V18	CC-POS	MICON	CC-POS	0~255	32
V19	SCREEN CUT OFF	1 Chip	CUT OFF	0~2	0
V20	SUB-VOL	1 Chip	A-ATT	0~127	127
V21	H-VCO	1 Chip	H-VCO	0~7	4
M01	MTS-ATT	MTS	ATT (MTS)	0~15	10
M02	MTS-VCO	MTS	VCO (MTS)	0~63	32
M03	MTS-FILTER	MTS	FILTER (MTS)	0~63	28
M04	MTS-WIDEBAND	MTS	WIDEBAND (MTS)	0~63	27
M05	MTS-SPECTRAL	MTS	SPECTRAL (MTS)	0~63	32
M06	SUB-VOL	MTS	VOL (MTS)	0~63	63

● SELF ADJUSTMENT

H-VCO

1. When there is H-VCO self-adjustment key input for adjustment item H-VCO, self-adjustment is performed.
2. H-FREE(1chip) is set to 1.
3. H-OUT is set by intelligent monitor output.
4. IM input is set as TIM input.
5. H-VCO(1chip) data is changed so that the number of input pulse is 125 inside 8ms interval.
6. When adjustment completed, OSD display and H-VCO self-adjustment status data of EEPROM are updated.
7. H-FREE(1chip), intelligent monitor output and IM input mode are recovered.

RF-AGC

1. When there is RF-AGC self-adjustment key input for adjustment item RF-AGC, self-adjustment is performed.
2. AGC-OUT is set by intelligent monitor output.
3. IM input is set as AD input.
4. By decreasing RF-AGC (1chip) data from current RF-AGC adjustment value to 0, AFT input voltage becomes the maximum setting value.
5. Increase RF-AGC(1chip) data, when AFT input voltage is at (max. 0.3V) point, adjustment is completed.
6. When adjustment completed, OSD display and RF-AGC self-adjustment status data of EEPROM are updated.
7. Intelligent monitor output and IM input mode are recovered.

PIF-VCO

1. When there is PIF-VCO self-adjustment key input for adjustment item PIF-VCO, self-adjustment is performed.
2. VIF-DEF(1chip) is set to 1.
3. AFC is set by intelligent monitor output.
4. IM input is set as AD input.
5. VIF-VCO(1chip) data is changed so that input voltage becomes 2.5V.
6. When adjustment completed, OSD display and PIF-VCO self-adjustment status data of EEPROM are updated.
7. VIF-DEF(1chip), intelligent monitor output and IM input mode are recovered.

Setting Mode Items

No.	Item Name	IC	Register	Range	Default
F01	VIDEO TONE -GAIN (TV)	1 Chips	V-TONE	0/1	0
F02	VIDEO TONE -GAIN (AV)	1 Chips	V-TONE	0/1	0
F03	VIDEO TONE -GAIN (S-AV)	1 Chips	V-TONE	0/1	0
F04	VIDEO TONE -GAIN(YUV)	1 Chips	V-TONE	0/1	0
F05	ABCL	1 Chips	ABCL	0/1	0
F06	BS	1 Chips	BS-OFF	0/1	0
F07	ABCL-G	1 Chips	ABCL-G	0/1	0
F08	SHP-AV	OFFSET	VIDEO-TONE(OFFSET)	-16~+16	0
F09	SHP-SAV	OFFSET	VIDEO-TONE(OFFSET)	-16~+16	0
F10	SHP-YUV	OFFSET	VIDEO-TONE(OFFSET)	-16~+16	0
F11	RGB-CLIP	1 Chips	EXTRGB-CLIP	0/1	0
F12	E-SAVE	OFFSET	CONTRAST(OFFSET)	0~63	30
F13	FAO-VOL	1 Chips	A-ATT	0~127	120
F14	PIF-G	1 Chips	VIF-GAIN	0~7	4
F15	Y-DELAY(TV)	1 Chips	Y-DELAY	0~7	0
F16	Y-DELAY(AV)	1 Chips	Y-DELAY	0~7	0
F17	Y-DELAY(SAV)	1 Chips	Y-DELAY	0~7	0
F18	Y-DELAY(YUV)	1 Chips	Y-DELAY	0~7	0
F19	TINT-AV	OFFSET	TINT(OFFSET)	-32~+32	0
F20	TINT-SAV	OFFSET	TINT(OFFSET)	-32~+32	0
F21	COL-AV	OFFSET	COLOR(OFFSET)	-32~+32	0
F22	COL-SAV	OFFSET	COLOR(OFFSET)	-32~+32	0
F23	R-DRI(R2)	OFFSET	R-DRI(OFFSET)	-32~+32	0
F24	R-DRI(R)	OFFSET	R-DRI(OFFSET)	-32~+32	0
F25	R-DRI(B)	OFFSET	R-DRI(OFFSET)	-32~+32	0
F26	B-DRI(R2)	OFFSET	B-DRI(OFFSET)	-32~+32	0
F27	B-DRI(R)	OFFSET	B-DRI(OFFSET)	-32~+32	0
F28	B-DRI(B)	OFFSET	B-DRI(OFFSET)	-32~+32	0
F29	V-FREE	1 Chips	V-FREE	0/1	0
F30	GAMMA	1 Chips	GAMMA	0~3	0
F31	TRAP(TV)	1 Chips	TRAP-FINE	0~3	2
F32	TRAP(AV)	1 Chips	TRAP-FINE	0~3	2
F33	H-FREE	1 Chips	H-FREE	0/1	0
F34	1W(TV)	1 Chips	V.WINDOW	0/1	0
F35	1W(AV)	1 Chips	V.WINDOW	0/1	0
F36	YLPF	1 Chips	YSW-LPF	0/1	1
F37	BS-D	1 Chips	BS-DISCHARGE	0~3	0
F38	BS-C	1 Chips	BS-CHARGE	0~3	0
F39	SL(TV)	1 Chips	S-SLICE DOWN	0~3	0
F40	SL(AV)	1 Chips	S-SLICE DOWN	0~3	0
F41	SL(SAV)	1 Chips	S-SLICE DOWN	0~3	0
F42	SL(YUV)	1 Chips	S-SLICE DOWN	0~3	0
F43	AFC2	1 Chips	AFC2-G	0/1	0
F44	VD(TV)	1 Chips	VSYNC-DET	0/1	0
F45	VD(AV)	1 Chips	VSYNC-DET	0/1	0
F46	AS(TV)	1 Chips	AUTO-SLICE	0/1	0
F47	AS(AV)	1 Chips	AUTO-SLICE	0/1	0
F48	AS(SAV)	1 Chips	AUTO-SLICE	0/1	0
F49	AS(YUV)	1 Chips	AUTO-SLICE	0/1	0
F50	FBP(TV)	1 Chips	FBP VTH	0/1	0
F51	FBP(AV)	1 Chips	FBP VTH	0/1	0
F52	FBP(SAV)	1 Chips	FBP VTH	0/1	0
F53	FBP(YUV)	1 Chips	FBP VTH	0/1	0
F54	C.CLIP LEVEL	1 Chips	C.CLIP LEVEL	0/1	0

Setting Mode Items (Continued)

No.	Item Name	IC	Register	Range	Default
F55	PSW	MTS	PSW	0/1	0
F56	FAO-VOL	MTS	VOL	0~63	60
F57	CP	PLL	CHARGE PUMP	0/1	0
F58	CC LEVEL	MICON	CC LEVEL	0/1	0
F59	OSD POS	MICON	OSD POS	0/1	0
F60	OFFSET-ADJ-COL	1 Chips	COLOR	-32~+32	0
F61	OFFSET-ADJ-TINT	1 Chips	TINT	-32~+32	0
F62	OFFSET-ADJ-TINT-YUV	1 Chips	BASEBAND-TINT	-32~+32	0
F63	TIMER4-LOW SPEED	1 Chips	TIMER4 VALUE	0~225	50
F64	TIMER4-HIGH SPEED	1 Chips	TIMER4 VALUE	0~225	125
F65	R-CUT-YUV	1 Chips	R-CUT(OFFSET)	-63~+63	0
F66	G-CUT-YUV	1 Chips	G-CUT(OFFSET)	-63~+63	0
F67	B-CUT-YUV	1 Chips	B-CUT(OFFSET)	-63~+63	0
F68	R-DRI-YUV	1 Chips	R-DRI(OFFSET)	-63~+63	0
F69	B-DRI-YUV	1 Chips	B-DRI(OFFSET)	-63~+63	0
F70	CLOCK-ADJ	1 Chips		0~25	25

Option Mode Items

No	OPTION FUNCTION	0	1	Default Data
001	DEMO	Without DEMO	With DEMO	1
002	DOWNLOAD	Without V-CHIP OP	With V-CHIP OP	0
003	V-CHIP	Without V-CHIP	With V-CHIP	0
004	SPEAKER	Without SPEAKER	With SPEAKER	1
005	FAO	Without FAO	With FAO	1
006	P.PREF	Without P.REF	With P.REF	1
007	UNIV+	Without UNIV+	With UNIV+	1
008	VIEW TIMER	Without VIEW TIMER	With VIEW TIMER	1
009	EZ-SETUP	EZ-SETUP	AUTO PRESET	0
010	PON-CH	Without POWER-ON	With POWER-ON	0
011	FAV-COL	FAV-COL	COL-TEMP	1
012	COMPONENT	Without COMPONENT	With COMPONENT	1
013	AV	Without AV	With AV	1
014	AV2	AV1 system	AV2 system	1
015	MTS	Without MTS	With MTS	1
016	TONE-CTRL	Without S-ADJ	With S-ADJ	1
017	AUTO-OFF	Without AUTO-OFF	With AUTO-OFF	1
018	INIT-LANG	ENGLISH	SPANISH	1
019	SETUP-FLAG	NO SET UP	AUTO SET UP	1
020	AV-FR	"0"=NO AV "1"=REAR "2"=FRONT "3"=REAR & FRONT		3
021	AV3/S-IN	Without AV3/S-IN	With AV3/S-IN	0
022	COMB	Without COMB	With COMB	0
023	AUTO-INPUT	Without AUTO-INPUT	With AUTO-INPUT	1
024	CLOCK	Without CLOCK	With CLOCK	1
025	LED	SEMEX MODEL	SPC MODEL	0
026	FLAT	Not FLAT MODEL	FLAT MODEL	1
027	BASS BOOST	Without BASS BOOST	With BASS BOOST	0
028	DSE	Without DSE	With DSE	0
029	SRS	Without SRS	With SRS	0
030	WHITE-OUT	Without WHITE-OUT	With WHITE-OUT	1

Check Mode

Micron mask version, software version and ROM correction function status are displayed in check mode.

ADJUSTMENT METHOD

Caution: to get into the service mode, one of the ways is press direct key for service items.

There is three stage of Service Mode data
First stage data from V01 ~ M06
to go into second stage of service mode data, press MENU key
Second stage data from F01 ~ F70
to go into third stage of service mode data, press MENU key
Third stage data from 001 ~ 030

Below is the contents of these data

First Stage

Data	Service Mode	Function	Range	Default Data
V01	SUB-PICTURE	CONTRAST	0~127	127
V02	SUB-TINT	TINT	0~127	64
V03	SUB-COLOR	COLOR	0~127	64
V04	SUB-BRIGHT	BRIGHT	0~255	128
V05	SUB-SHARP	VIDEO-TONE	0~63	43
V06	V-SHIFT	V-SHIFT	0~7	4
V07	H-SHIFT	H-PHASE	0~31	16
V08	RF-AGC	RF-DELAY	0~127	127
V09	V-SIZE	V-SIZE	0~63	32
V10	PIF-VCO	VIF-VCO	0~63	32
V11	R-CUTOFF	R-CUTOFF	0~255	127
V12	G-CUTOFF	G-CUTOFF	0~255	127
V13	B-CUTOFF	B-CUTOFF	0~255	127
V14	R-DRIVE	R-DRIVE	0~127	64
V15	B-DRIVE	B-DRIVE	0~127	64
V16	SUB-COLOR(YUV)	COLOR	0~127	64
V17	SUB-TINT(YUV)	BASEBAND-TINT	0~127	64
V18	CC-POS	CC-POS	0~255	32
V19	SCREEN CUT OFF	CUT OFF	0~2	0
V20	SUB-VOL	A-ATT	0~127	127
V21	H-VCO	H-VCO	0~7	4
M01	MTS-ATT	ATT (MTS)	0~15	10
M02	MTS-VCO	VCO (MTS)	0~63	32
M03	MTS-FILTER	FILTER (MTS)	0~63	28
M04	MTS-WIDEBAND	WIDEBAND (MTS)	0~63	27
M05	MTS-SPECTRAL	SPECTRAL (MTS)	0~63	32
M06	SUB-VOL	VOL (MTS)	0~63	63

Auto Adjustment Item
1. H-VCO
2. RF-AGC
3. PIF-VCO

Second Stage

Data	Service Mode	Function	Range	Default Data
F01	VIDEO TONE -GAIN (TV)	V-TONE	0/1	0
F02	VIDEO TONE -GAIN (AV)	V-TONE	0/1	0
F03	VIDEO TONE -GAIN (S-AV)	V-TONE	0/1	0
F04	VIDEO TONE -GAIN(YUV)	V-TONE	0/1	0
F05	ABCL	ABCL	0/1	0
F06	BS	BS-OFF	0/1	0
F07	ABCL-G	ABCL-G	0/1	0
F08	SHP-AV	VIDEO-TONE(OFFSET)	-16~+16	0
F09	SHP-SAV	VIDEO-TONE(OFFSET)	-16~+16	0
F10	SHP-YUV	VIDEO-TONE(OFFSET)	-16~+16	0
F11	RGB-CLIP	EXTRGB-CLIP	0/1	0
F12	E-SAVE	CONTRAST(OFFSET)	0~63	30
F13	FAO-VOL	A-ATT	0~127	120
F14	PIF-G	VIF-GAIN	0~7	4
F15	Y-DELAY(TV)	Y-DELAY	0~7	0
F16	Y-DELAY(AV)	Y-DELAY	0~7	0
F17	Y-DELAY(SAV)	Y-DELAY	0~7	0
F18	Y-DELAY(YUV)	Y-DELAY	0~7	0
F19	TINT-AV	TINT(OFFSET)	-32~+32	0
F20	TINT-SAV	TINT(OFFSET)	-32~+32	0
F21	COL-AV	COLOR(OFFSET)	-32~+32	0
F22	COL-SAV	COLOR(OFFSET)	-32~+32	0
F23	R-DRI(R2)	R-DRI(OFFSET)	-32~+32	0
F24	R-DRI(R)	R-DRI(OFFSET)	-32~+32	0
F25	R-DRI(B)	R-DRI(OFFSET)	-32~+32	0
F26	B-DRI(R2)	B-DRI(OFFSET)	-32~+32	0
F27	B-DRI(R)	B-DRI(OFFSET)	-32~+32	0
F28	B-DRI(B)	B-DRI(OFFSET)	-32~+32	0
F29	V-FREE	V-FREE	0/1	0
F30	GAMMA	GAMMA	0~3	0
F31	TRAP(TV)	TRAP-FINE	0~3	2
F32	TRAP(AV)	TRAP-FINE	0~3	2
F33	H-FREE	H-FREE	0/1	0
F34	1W(TV)	V.WINDOW	0/1	0
F35	1W(AV)	V.WINDOW	0/1	0
F36	YLPF	YSW-LPF	0/1	1
F37	BS-D	BS-DISCHARGE	0~3	0
F38	BS-C	BS-CHARGE	0~3	0
F39	SL(TV)	S-SLICE DOWN	0~3	0
F40	SL(AV)	S-SLICE DOWN	0~3	0
F41	SL(SAV)	S-SLICE DOWN	0~3	0
F42	SL(YUV)	S-SLICE DOWN	0~3	0
F43	AFC2	AFC2-G	0/1	0
F44	VD(TV)	VSYNC-DET	0/1	0
F45	VD(AV)	VSYNC-DET	0/1	0
F46	AS(TV)	AUTO-SLICE	0/1	0
F47	AS(AV)	AUTO-SLICE	0/1	0
F48	AS(SAV)	AUTO-SLICE	0/1	0
F49	AS(YUV)	AUTO-SLICE	0/1	0
F50	FBP(TV)	FBP VTH	0/1	0
F51	FBP(AV)	FBP VTH	0/1	0
F52	FBP(SAV)	FBP VTH	0/1	0
F53	FBP(YUV)	FBP VTH	0/1	0
F54	C.CLIP LEVEL	C.CLIP LEVEL	0/1	0
F55	PSW	PSW	0/1	0
F56	FAO-VOL	VOL	0~63	60

Second Stage (Continued)

Data	Service Mode	Function	Range	Default Data
F57	CP	CHARGE PUMP	0/1	0
F58	CC LEVEL	CC LEVEL	0/1	0
F59	OSD POS	OSD POS	0/1	0
F60	OFFSET-ADJ-COL	COLOR	-32~+32	0
F61	OFFSET-ADJ-TINT	TINT	-32~+32	0
F62	OFFSET-ADJ-TINT-YUV	BASEBAND-TINT	-32~+32	0
F63	TIMER4-LOW SPEED	TIMER4 VALUE	0~225	50
F64	TIMER4-HIGH SPEED	TIMER4 VALUE	0~225	125
F65	R-CUT-YUV	R-CUT(OFFSET)	-63~+63	0
F66	G-CUT-YUV	G-CUT(OFFSET)	-63~+63	0
F67	B-CUT-YUV	B-CUT(OFFSET)	-63~+63	0
F68	R-DRI-YUV	R-DRI(OFFSET)	-63~+63	0
F69	B-DRI-YUV	B-DRI(OFFSET)	-63~+63	0
F70	CLOCK-ADJ		0~25	25

Third Stage

Data	OPTION FUNCTION	DATA = "0"	DATA ="1"	Default Data
001	DEMO	DEMO DISABLE	ENABLE	1
002	DOWNLOAD	V-CHIP OP DISABLE	ENABLE	0
003	V-CHIP	V-CHIP DISABLE	ENABLE	0
004	SPEAKER	SPEAKER DISABLE	ENABLE	1
005	FAO	FAO DISABLE	ENABLE	1
006	P.PREF	P.REF DISABLE	ENABLE	1
007	UNIV+	UNIV+ DISABLE	ENABLE	1
008	VIEW TIMER	VIEW TIMER DISABLE	ENABLE	1
009	EZ-SETUP	EZ-SETUP	AUTO PRESET	0
010	* PON-CH	POWER-ON DISABLE	ENABLE	0
011	FAV-COL	FAV-COL	COL-TEMP	1
012	COMPONENT	COMPONENT DISABLE	ENABLE	1
013	AV	AV DISABLE	ENABLE	1
014	AV2	AV1	AV2	1
015	MTS	MTS DISABLE	ENABLE	1
016	TONE-CTRL	S-ADJ DISABLE	ENABLE	1
017	AUTO-OFF	AUTO-OFF DISABLE	ENABLE	1
018	INIT-LANG	ENGLISH	SPANISH	1
019	SETUP-FLAG	NO SET UP	AUTO SET UP	1
020	AV-FR	"0"=NO AV "1"=REAR "2"=FRONT "3"=REAR & FRONT		3
021	AV3/S-IN	AV3/S-IN DISABLE	ENABLE	0
022	COMB	COMB DISABLE	ENABLE	0
023	AUTO-INPUT	AUTO-INPUT DISABLE	ENABLE	1
024	CLOCK	CLOCK DISABLE	ENABLE	1
025	LED	SEMEX MODEL	SPC MODEL	0
026	FLAT	FLAT DISABLE	ENABLE	1
027	BASS BOOST	BASS BOOST DISABLE	ENABLE	0
028	DSE	DSE DISABLE	ENABLE	0
029	SRS	SRS DISABLE	ENABLE	0
030	WHITE-OUT	WHITE-OUT DISABLE	ENABLE	1

**POWER ON BY CH-UP/CH-DOWN KEY

ADJUSTMENT ITEM	OPTION SET UP		
ADJUSTMENT POSITION	REFER AS BELOW	STEP RANGE	REFER AS BELOW
CONTROL	-		
PRE-ADJUST REQUIREMENT	-		
CONTENT	-		
INPUT CONDITION	21V-R70M		
OUTPUT	OSD CHECKING		

ADJUSTMENT PROCEDURE

BUS OPTION FOR THIRD STAGE SERVICE DATA

FUNCTION	001 DEMO	002 DOWNLOAD	003 V-CHIP	004 SP	005 FAO	006 P.PREF	007 UNIV+	008 VIEW	009 EZ	010 PON-CH
21V-R70M	1	0	0	0	0	0	0	1	0	1
DEF	"0" =DISABLE "1" = ENABLE 009 -> "0" = EZ-SETUP "1" = AUTO PRESET									

BUS OPTION FOR THIRD STAGE SERVICE DATA

FUNCTION	011 FAV-COL	012 COMP	013 AV	014 AV2	015 MTS	016 TONE	017 AUTO	018 LAN	019 SETUP	020 AV-FR
21V-R70M	1	0	1	0	0	1	1	0	1	1

FUNCTION	021 AV3	022 COMB	023 A-IN	024 CLOCK	025 LED	026 FLAT	027 BASS	028 DSE	029 SRS	030 WHITE
21V-R70M	0	0	0	0	1	0	0	0	0	0
DEF	011 -> "0" = FAV-COL "1" = COL-TEMP 018 -> "0" = ENGLISH "1" = SPANISH 019 -> "0" = NO SET UP "1" = AUTO SETIP 025 -> "0" = SEMEX SPEC "1" = SPC SPEC									

HISTORY OF REVISION	SYMBOL	REVISED CONTENT,

ADJUSTMENT ITEM	BUS SET UP		
ADJUSTMENT POSITION	REFER AS BELOW	STEP RANGE	REFER AS BELOW
CONTROL	-		
PRE-ADJUST REQUIREMENT	-		
CONTENT	-		
INPUT CONDITION	21V-R70M		
OUTPUT	OSD CHECKING		

ADJUSTMENT PROCEDURE

DATA SETUP FOR FIRST AND SECOND STAGE SERVICE DATA

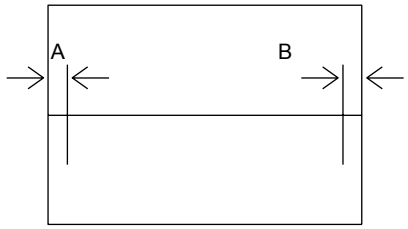
FUNCTION	V05 SHARP	F15 Y-DL(TV)	F16 Y-DL(AV)	F19 TINT-AV	F21 COL-AV	F23 R-D(R2)	F24 R-D(R)	F25 R-D(B)	F26 B-D(R2)	F27 B-D(R)	F28 B-D(B)
21V-R70M	45	5	2	-2	+2	+8	+3	-2	-18	-8	+6
DEF											

DATA SETUP FOR FIRST AND SECOND STAGE SERVICE DATA

FUNCTION	F30 GAMMA	F35 1W(AV)	F39 SL(TV)	F40 SL(AV)	F44 VD(TV)	F46 AS(TV)	F47 AS(AV)	F56 FAO-VOL	F57 CP	F60 C-OF	F61 TINT-OF
21V-R70M	1	1	1	1	1	1	1	58	1	+10	+8

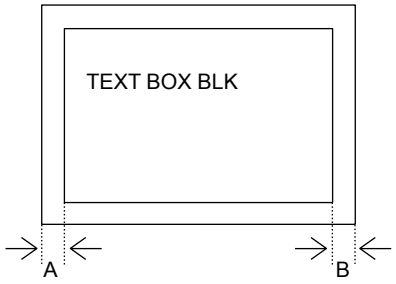
FUNCTION	F62 TI-YUV	F66 G-C-YUV	F67 B-C-YUV	F36 YLPF							
21V-R70M	-12	+36	+2	1							
DEF											

HISTORY OF REVISION	SYMBOL	REVISED CONTENT,

ADJUSTMENT ITEM	H-POSITION		
ADJUSTMENT POSITION	V07	STEP RANGE	0-31
CONTROL	I²C BUS CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP, CRT-PURITY		
CONTENT	US 6 CH LION HEAD (MONOSCOPE)		
INPUT CONDITION	AC 230V, US MAGNETIC FIELD		
OUTPUT	CONFIRMATION BY CRT SCREEN		
ADJUSTMENT PROCEDURE	1. ADJUST THE V07 BUS DATA TO HAVE A BALANCE POSITION TO SPEC OF A=B. 2. IF CANNOT MAKE IT TO A=B, ADJ FROM THE BEST POINT SO THAT B SLIDELY SMALLER THAN A  		
	[CHECKING SPEC] LEFT AND RIGHT SYMMETRICAL		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

ADJUSTMENT ITEM	V-SIZE		
ADJUSTMENT POSITION	V09	STEP RANGE	0~63
CONTROL	I²C CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP, CRT PURITY, V-PHASE, +B ADJUST		
CONTENT	US 6 CH LION HEAD		
INPUT CONDITION	AC 230V		
OUTPUT	CONFIRMATION BY CRT SCREEN		
ADJUSTMENT PROCEDURE	ADJUST THE V09 BUS DATA UNTILL THE OVERSCAN BECOME AS SPECIFIED BELOW. CAUTION: - PLEASE AGING TV MORE THAN 10 MINUTES BEFORE ADJUSTMENT.		
	[CHECKING SPEC] OVERSCAN 10 ± 2.5%		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

ADJUSTMENT ITEM	V-PHASE		
ADJUSTMENT POSITION	V06	STEP RANGE	0-7
CONTROL	I²C CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP, CRT-PURITY		
CONTENT	US 6 CH LION HEAD (MONOSCOPE PATTERN)		
INPUT CONDITION	230V, RF INPUT, ZERO MAGNETIC FIELD		
OUTPUT	CONFIRMATION ON CRT SCREEN		
ADJUSTMENT PROCEDURE	ADJUST V06 BUS DATA TO HAVE MOST ACCEPTABLE VERTICAL POSITION. THE MONOSCOPE PATTERN SHOULD BE BALANCE IN VERTICAL POSITION NOTE: THE DATA FOR V06 LIMIT AT <= 04, EVEN POSITION GOOD ENOUGH		
	[CHECKING CONFIRMATION]		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

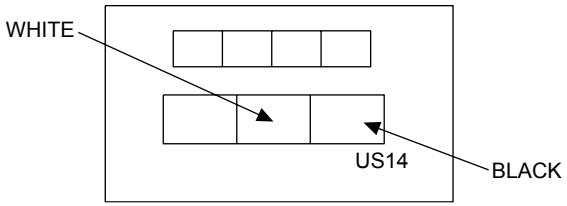
ADJUSTMENT ITEM	CLOSED CAPTION SET UP		
ADJUSTMENT POSITION	V18	STEP RANGE	0~255
CONTROL	I²C CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP		
CONTENT	US 6 CH LION HEAD		
INPUT CONDITION	AC 230V		
OUTPUT	CONFIRMATION ON CRT DISPLAY.		
ADJUSTMENT PROCEDURE	1) BY SELECTING THE V18, BOX BLK TEXT WILL BE APPEARED. 2) ADJUST THE V18 BUS DATA TO HAVE A BALANCE POSITION TO SPEC OF A=B.  		
	[CHECKING SPEC] LEFT AND RIGHT SYMMETRICAL		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

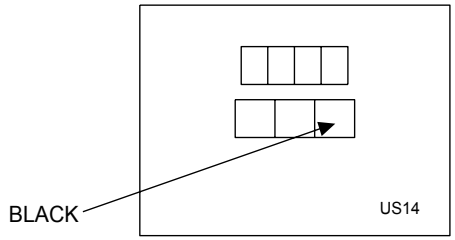
ADJUSTMENT ITEM	H-VCO		
ADJUSTMENT POSITION	V21	STEP RANGE	0-7
CONTROL	I²C CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP		
CONTENT	NO SIGNAL (RASTER) CONDITION		
INPUT CONDITION	AC 230V		
OUTPUT	IC 801 PIN 11		
ADJUSTMENT PROCEDURE	(MANUAL ADJ) 1) GO TO SERVICE MODE, 2) GO TO SERVICE DATA V21, ADJ UNTIL FREQ AS BELOW (SELF ADJ) 1) GO TO SERVICE MODE,BY SELECTING THE SERVICE DATA V21 2) PRESS THE R/C TO OPERATE AUTO H-VCO,OSD APPEAR "OK" AT SCREEN 3) IF APPEAR "NG" PLS REPEAT STEP2		
	[CHECKING SPEC] FREQ = 15.735 ± 0.2 KHz		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

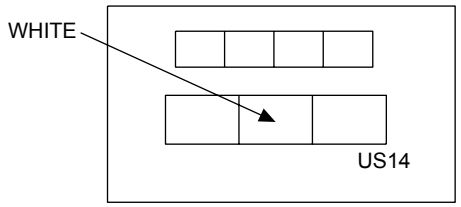
ADJUSTMENT ITEM	PIF-VCO		
ADJUSTMENT POSITION	V10	STEP RANGE	0~63
CONTROL	I²C CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP		
CONTENT	NO SIGNAL (RASTER) CONDITION		
INPUT CONDITION	AC 230V		
OUTPUT	CONFIRMATION ON CRT DISPLAY (AUTO), IC801 PIN 2 VOLTAGE (MANUAL).		
ADJUSTMENT PROCEDURE	(AT SELF ADJUSTMENT MODE) 1) GO INTO SERVICE MODE, BY SELECTING THE SERVICE DATA V10 2) PRESS THE R/C FOR AUTO PIF-VCO KEY, OSD APPEAR "OK" AT SCREEN 3) IF APPEAR "NG" PLS REPEAT STEP 2 (AT MANUAL ADJUSTMENT MODE) 1) GO INTO SERVICE MODE, BY SELECTING THE SERVICE DATA V10 2) ADJUST THE DATA UP/DOWN UNTIL IC801 PIN 2 VOLTAGE BECOME AS SPECIFIED BELOW		
	[CHECKING SPEC] 2.5 ± 0.5 V DC (CHECKING SPEC : 2.50 ± 1.5V)		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

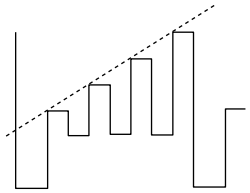
ADJUSTMENT ITEM	RF-AGC		
ADJUSTMENT POSITION	V08	STEP RANGE	0-127
CONTROL	I²C CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP		
CONTENT	US10CH HALF COLOR BAR		
INPUT CONDITION	RF INPUT FIELD STRENGTH 53dB uV (FIX)		
OUTPUT	TUNER AGC TERMINAL (TP 201) OR CRT DISPLAY CONFIRMATION		
ADJUSTMENT PROCEDURE	(AT SELF ADJUSTMENT MODE) 1. GO TO SERVICE MODE 2. GO TO SERVICE DATA V08, PRESS R/C TO OPERATE AUTO-AGC KEY AND CONFIRM THE OK DISPLAY ON THE SCREEN. 3. IF APPEAR NG PLS REPEAT STEP 2 AGAIN. (AT MANUAL ADJUSTMENT MODE) 1. ADJUST THE V08 BUS DATA UNTIL AGC TERMINAL VOLTAGE BECOME MAXIMUM, THEN DROP 0.1V BELOW MAXIMUM VOLTAGE. 2. CHANGE THE ANTENNA INPUT SIGNAL TO 63-67 dBmV, AND MAKE SURE THERE IS NO NOISE 3. CHANGE THE ANTENNA INPUT SIGNAL TO 90-95 dBmV TO BE SURE THAT THERE IS NO CROSS MODULATION BEAT.		
	[VOLTAGE CONFIRMATION] MAX - 0.1V dc		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

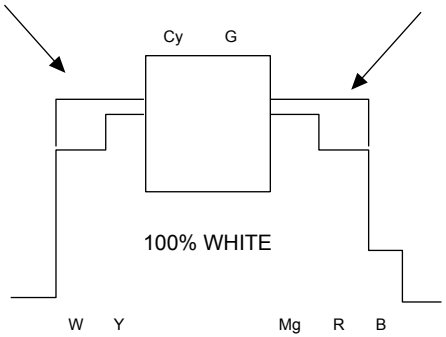
ADJUSTMENT ITEM	SCREEN		
ADJUSTMENT POSITION	V11,V12,V13	STEP RANGE	0-255
CONTROL	I²C CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP		
CONTENT	WINDOW PATTERN OR US6 CH LION HEAD		
INPUT CONDITION	230V		
OUTPUT	CONFIRMATION ON CRT DISPLAY		
ADJUSTMENT PROCEDURE	1) IN SERVICE MODE, SET V04&V11&V12&V13 TO 127; V14&V15 TO 64, GET IN Y-MUTE BY R/C AND SET V19 TO "1", PICTURE APPEAR IN CUT-OFF CONDITION 2) ADJUST THE SCREEN SO THAT CUT-OFF LINE APPEAR IN LOW BRIGHT, THEN JUDGE THAT WHETHER THE CUT-OFF LINE APPEAR IN RED OR GREEN OR BLUE COLOR, IN THIS CONDITION V11=R-CUTOFF, V12=G-CUTOFF, V13=B-CUT-OFF, FIX THE DATA OF THE COLOR APPEAR IN CUTOFF LINE AND USE R/C TO ADJUST THE OTHER TWO CUT-OFF DATA SO THAT CUT-OFF LINE COLOR BECOME WHITE. 3) TURN THE SCREEN VR OF FBT SO THAT CUT-OFF LINE JUST DISAPPEAR AND USE R/C TO SET V19 TO "0", NEXT DIASBLE THE Y-MUTE SO THAT PICTURE APPEAR IN NORMAL MODE.		
	[VOLTAGE CONFIRMATION]		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

ADJUSTMENT ITEM	WHITE BALANCE		
ADJUSTMENT POSITION	V14,V15,V11,V12,V13	STEP RANGE	0-127, 0~255
CONTROL	I²C BUS CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP, SCREEN		
CONTENT	23CH 501RE WINDOW PATTERN		
INPUT CONDITION	230V		
OUTPUT	CRT SCREEN DISPLAY.		
ADJUSTMENT PROCEDURE	1) WHITE (HIGH BEAM) FIRST LET THE GUN POINT AT BLACK POSITION (AS DRAWING ATTACH), ADJ V04 UNTIL BRIGHTNESS Y BECOME 5 cd/m2 , THEN LET THE GUN POINT AT WHITE POSITION (AS DRAWING ATTACH), ADJUST V01 UNTIL BRIGHTNESS Y BECOME 150 cd/m2 , ADJUST THE BUS DATA OF V14 (R DRIVE), V15(B DRIVE) UNTIL THE AXIS OF COLOR TEMPERATURE BECOME X=0.273, Y=0.280 2) BLACK (LOW BEAM) LET THE GUN POINT AT BLACK POSITION, IF THE VALUE SHIFTED AWAY FROM THE DATA ADJUSTED IN STEP 1), ADJUST AGAIN THE TWO SERVICE DATA WHICH HAVE CHOSEN AT SCREEN ADJUST SO THAT TO OBTAIN THE SIMILAR AXIS AS ABOVE. *WARNING: DO NOT DISTURB THE MINI STEP GUN DATA DURING THIS ADJUSTMENT. **REPEAT STEP 1), 2) TO GET A REGULATED POSITION.  		
	[CHECKING CONFIRMATION] X=0.273, Y=0.280 (11,600°K + 1 MPCD)		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

ADJUSTMENT ITEM	SUB-BRIGHT		
ADJUSTMENT POSITION	V04	STEP RANGE	0-255
CONTROL	I²C CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP, SCREEN, WHITE BALANCE		
CONTENT	WINDOW PATTERN		
INPUT CONDITION	230V		
OUTPUT	CRT SCREEN DISPLAY.		
ADJUSTMENT PROCEDURE	1) LET THE GUN POINT AT BLACK POSITION (AS ATTACH DRAWING), ADJUST V04 BUS DATA UNTIL BRIGHTNESS Y=0.5 cd/m2, THEN STEP DOWN MORE 4 STEP  		
	[VOLTAGE CONFIRMATION] BRIGHTNESS Y=0.5 cd/m2, THEN STEP DOWN MORE 4 STEP		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

ADJUSTMENT ITEM	SUB-PICTURE		
ADJUSTMENT POSITION	V01	STEP RANGE	0-127
CONTROL	I²C BUS CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP, SCREEN, WHITE BALANCE, SUB-BRIGHTNESS		
CONTENT	WINDOW PATTERN		
INPUT CONDITION	230V		
OUTPUT	CRT SCREEN DISPLAY.		
ADJUSTMENT PROCEDURE	1) LET THE GUN POINT AT WHITE POSITION (AS ATTACH DRAWING), ADJUST V01 BUS DATA UNTIL BRIGHTNESS Y=150 cd/m2. NOTE: ALLOWABLE DATA FOR V01 IS >= 90, EVEN Y CAN'T MATCH THE SPEC  		
	[VOLTAGE CONFIRMATION] BRIGHTNESS Y=150 cd/m2		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

ADJUSTMENT ITEM	SUB-TINT		
ADJUSTMENT POSITION	V02	STEP RANGE	0-127
CONTROL	I²C CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP, VCO ADJ, RF-AGC		
CONTENT	US 10 CH HALF COLOR BAR PATTERN		
INPUT CONDITION	230V		
OUTPUT	B-AMP TR BASE (TP853) CONFIRM WITH OSCILLOSCOPE		
ADJUSTMENT PROCEDURE	1) GET IN Y-MUTE FUNCTION BY R/C. 2) ADJUST THE V02 BUS DATA TO GET A WAVEFORM AS BELOW. 3) DISABLE THE Y-MUTE **PLS TAKE NOTE THAT SERVICE MODE DATA F61 NEED TO SET +8  B-AMP BASE (TP853) MUST BE IN STEPPING LEVEL		
	[CONFIRMATION]		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

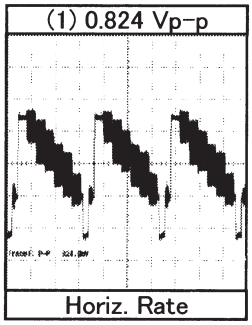
ADJUSTMENT ITEM	SUB-COLOR		
ADJUSTMENT POSITION	V03	STEP RANGE	0-127
CONTROL	I^2C BUS CONTROL		
PRE-ADJUST REQUIREMENT	OPTION SET UP, BUS SET UP, VCO ADJ, RF-AGC, SUB-PICT, SUB-TNT		
CONTENT	US 10 CH HALF COLOR BAR PATTERN		
INPUT CONDITION	230V		
OUTPUT	R-AMP TR BASE (TP851) CONFIRM WITH OSCILLOSCOPE		
ADJUSTMENT PROCEDURE	1) SET THE V03 BUS DATA TO GET A WAVEFORM AS BELOW 2) THIS WAVEFORM SHOWS THAT THE 75% WHITE & RED PORTIONS OF COLOR BAR BEAT AT THE SAME LEVEL *PLEASE TAKE NOTE THAT SERVICE DATA F60 MUST SET TO +10  		
	[CHECKING CONFIRMATION]		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

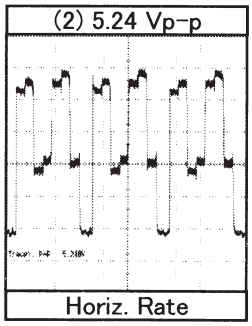
ADJUSTMENT ITEM	X-RAY PROTECTION OPERATING CONFIRMATION		
ADJUSTMENT POSITION	-	STEP RANGE	-
CONTROL	-		
PRE-ADJUST REQUIREMENT	AFTER ALL ADJUSTMENT FINISHED.		
CONTENT	US 6 CH LION HEAD (MONOSCOPE PATTERN)		
INPUT CONDITION	AC 230V, RF INPUT		
OUTPUT	CONFIRMATION BY THE CRT		
ADJUSTMENT PROCEDURE	SET THE USER CONTROL TO SHIPMENT POSITION. [VOLTAGE CONFIRMATION] CHECK THE VOLTAGE OF P603 PIN 3 AS SPECIFIED BELOW. [OPERATION CONFIRMATION] SUPPLY THE DC VOLTAGE TO P603 PIN 3 AND MAKE SURE THE PROTECTOR IS FUNCTIONED. HORIZONTAL OSCILATION STOP AND PICTURE DISAPPEAR. [RECOVER INFORMATION] PULL OUT THE AC CORD. [CAUTION] FROM THE RECOVER CONFIRMATION MENTIONED ABOVE, THE AC CODE MUST BE PULLED OUT AT LEAST 4 SECOND BEFORE PLUGGING IN AGAIN.(IN ORDER TO MAKE SURE THE u-COM HAS BEEN RESET.)		
	[VOLTAGE CONFIRMATION]		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

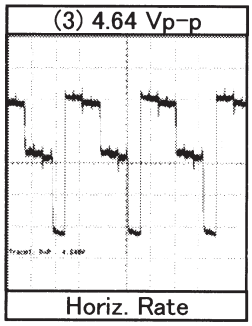
TP VOLTAGE	OPERATION VOLTAGE
26± 1.1V DC	27V

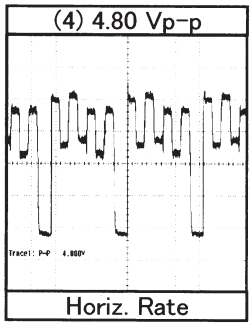
ADJUSTMENT ITEM	HIGH VOLTAGE		
ADJUSTMENT POSITION	-	STEP RANGE	-
CONTROL	-		
PRE-ADJUST REQUIREMENT	AFTER ALL ADJUSTMENT FINISHED.		
CONTENT	US 6 CH LION HEAD (MONOSCOPE PATTERN)		
INPUT CONDITION	AC 230V, RF INPUT		
OUTPUTW	CRT ANODE VOLTAGE		
ADJUSTMENT PROCEDURE	SET THE USER CONTROL TO SHIPMENT SETTING POSITION. PUSH ON Y-MUTE BY R/C CONFIRM THE VOLTAGE OF CRT ANODE BY HIGH VOLTAGE METER AND MAKE SURE THE READING IS AS BELOW. HIGH VOLTAGE BELOW 28.5kV		
	[CAUTION POINT] USE ELECTROSTATIC HI-VOLTAGE METER AND FOLLOW THE UL/ DHHS STANDARD TO MAKE CORRECTION AND CONTROL.		
HISTORY OF REVISION	SYMBOL	REVISED CONTENT,	

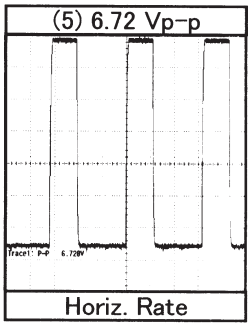
WAVEFORMS

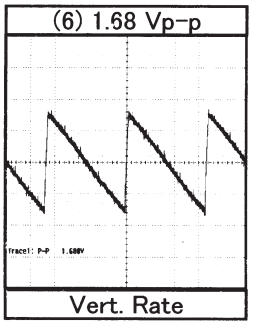

(1) 0.824 Vp-p
Horiz. Rate

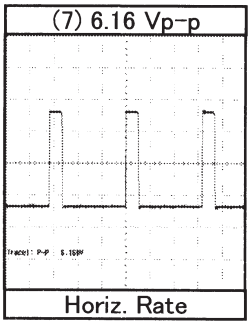

(2) 5.24 Vp-p
Horiz. Rate

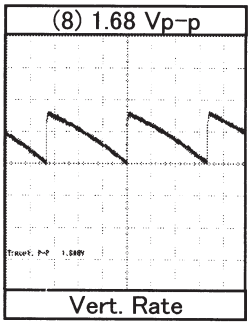

(3) 4.64 Vp-p
Horiz. Rate

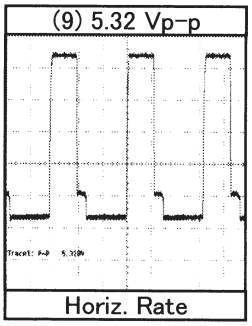

(4) 4.80 Vp-p
Horiz. Rate

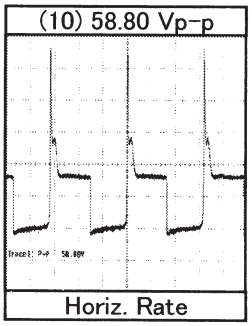

(5) 6.72 Vp-p
Horiz. Rate

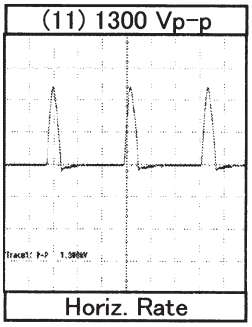

(6) 1.68 Vp-p
Vert. Rate

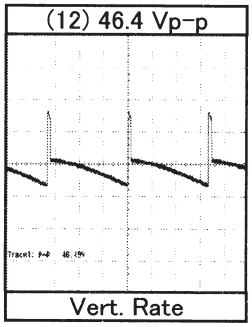

(7) 6.16 Vp-p
Horiz. Rate

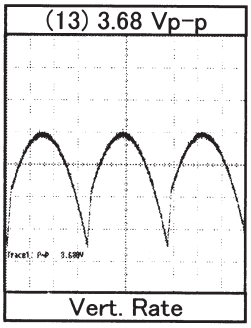

(8) 1.68 Vp-p
Vert. Rate

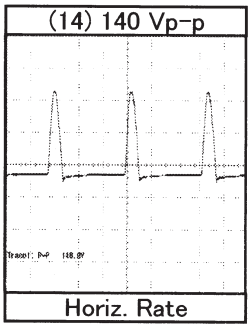

(9) 5.32 Vp-p
Horiz. Rate

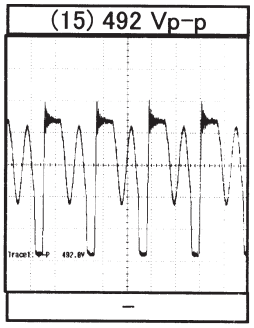

(10) 58.80 Vp-p
Horiz. Rate

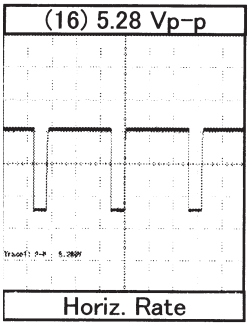

(11) 1300 Vp-p
Horiz. Rate

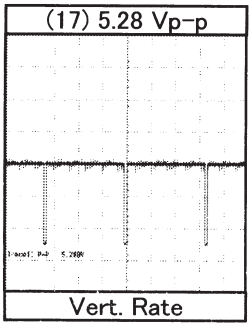

(12) 46.4 Vp-p
Vert. Rate

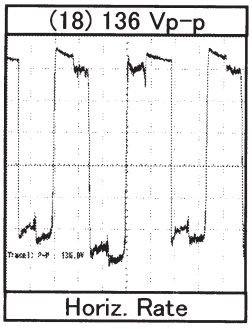

(13) 3.68 Vp-p
Vert. Rate

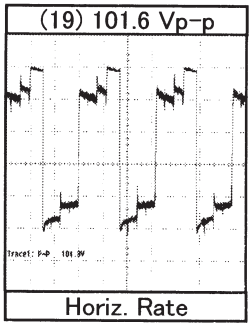

(14) 140 Vp-p
Horiz. Rate

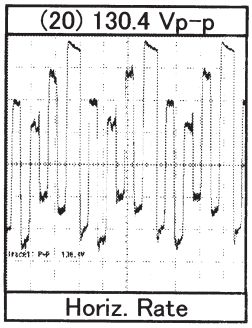

(15) 492 Vp-p
–


(16) 5.28 Vp-p
Horiz. Rate

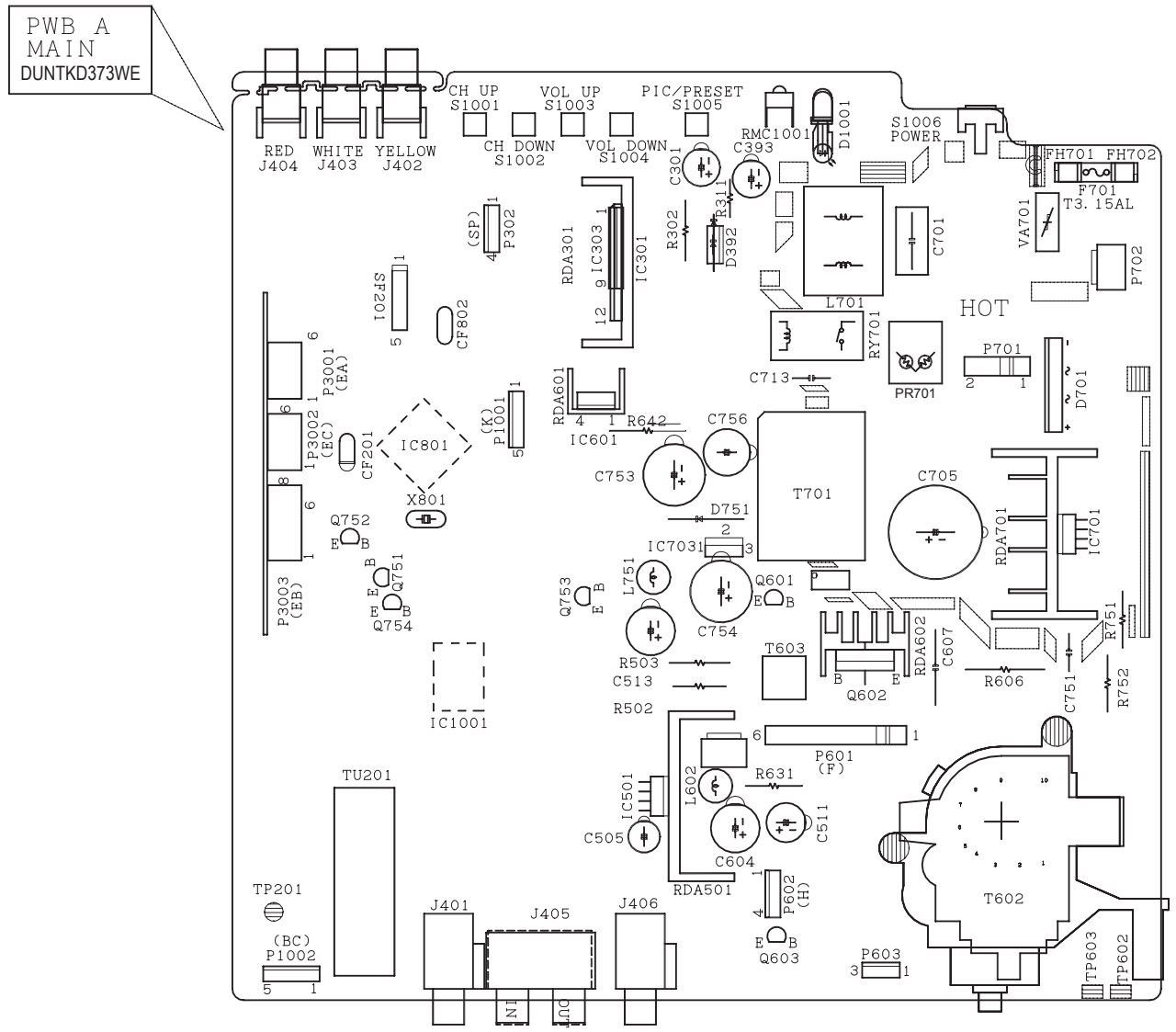

(17) 5.28 Vp-p
Vert. Rate

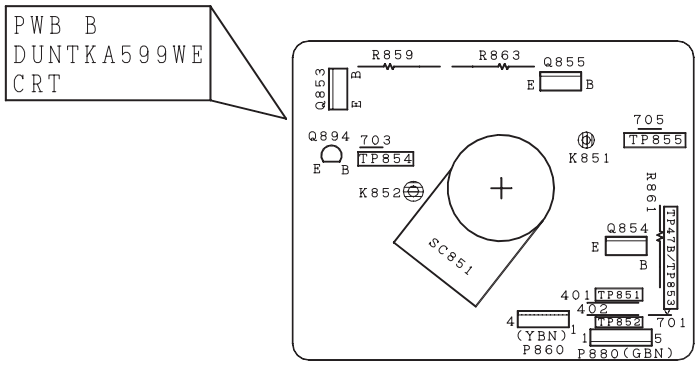

(18) 136 Vp-p
Horiz. Rate


(19) 101.6 Vp-p
Horiz. Rate

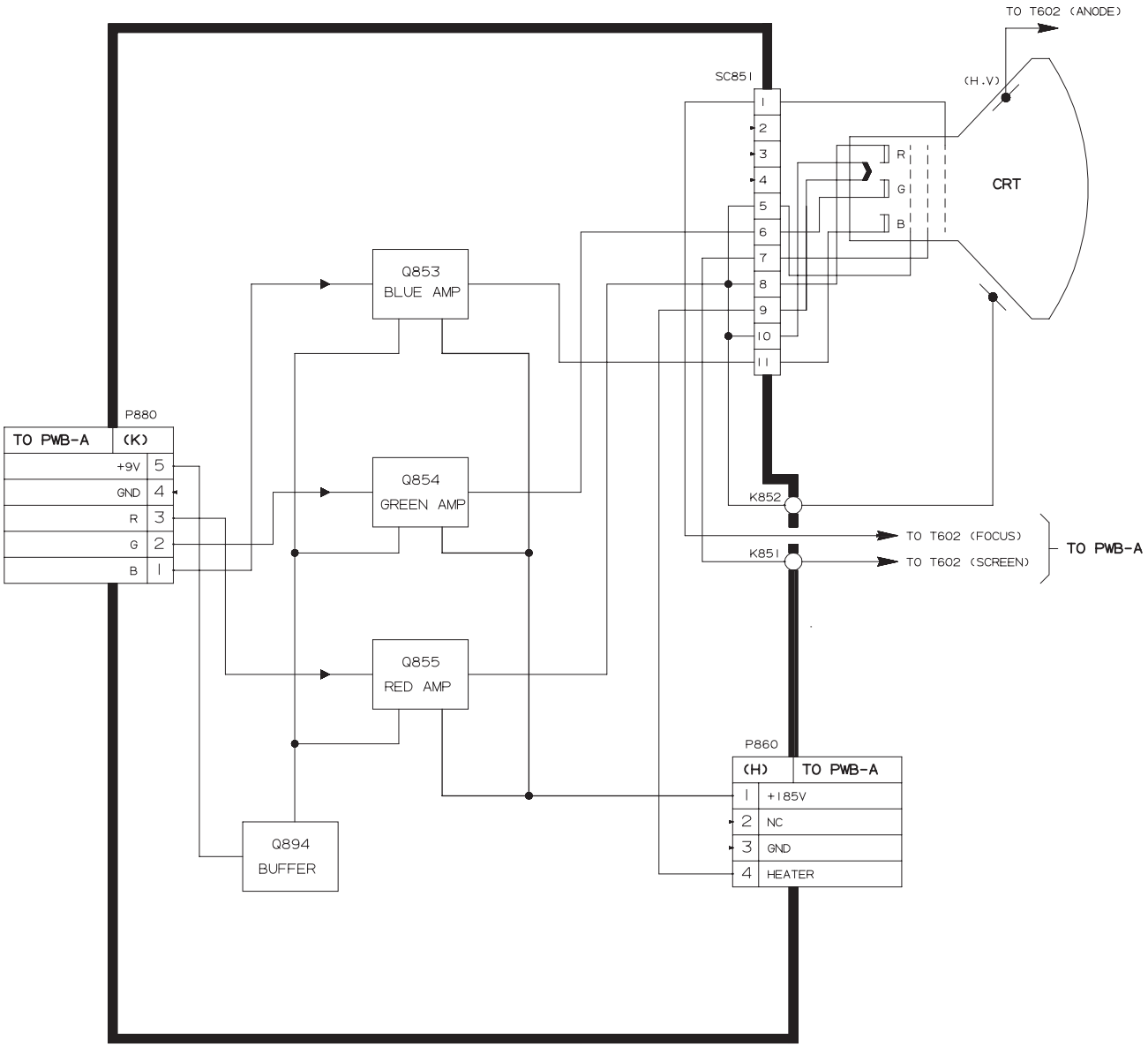

(20) 130.4 Vp-p
Horiz. Rate

CHASSIS LAYOUT

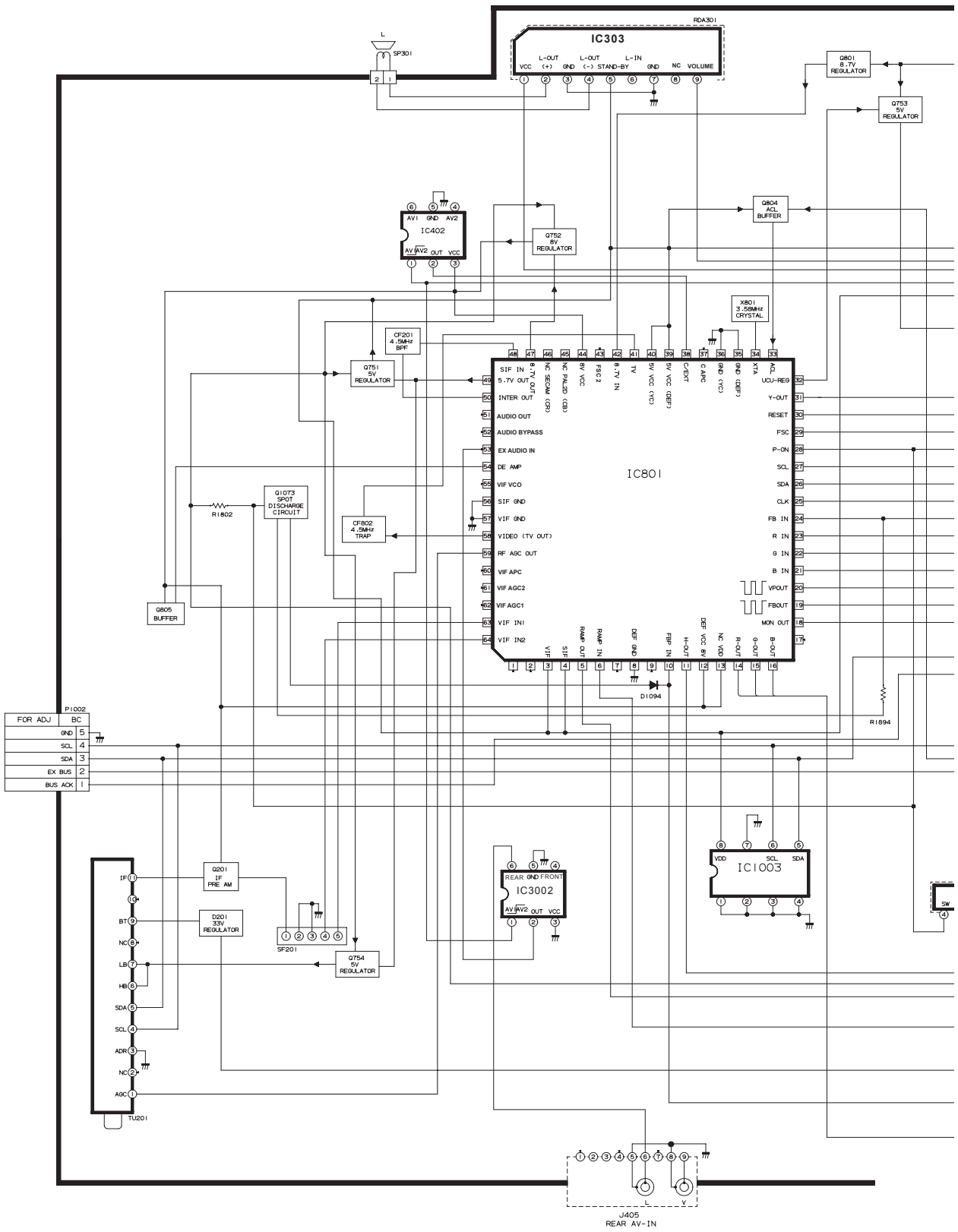


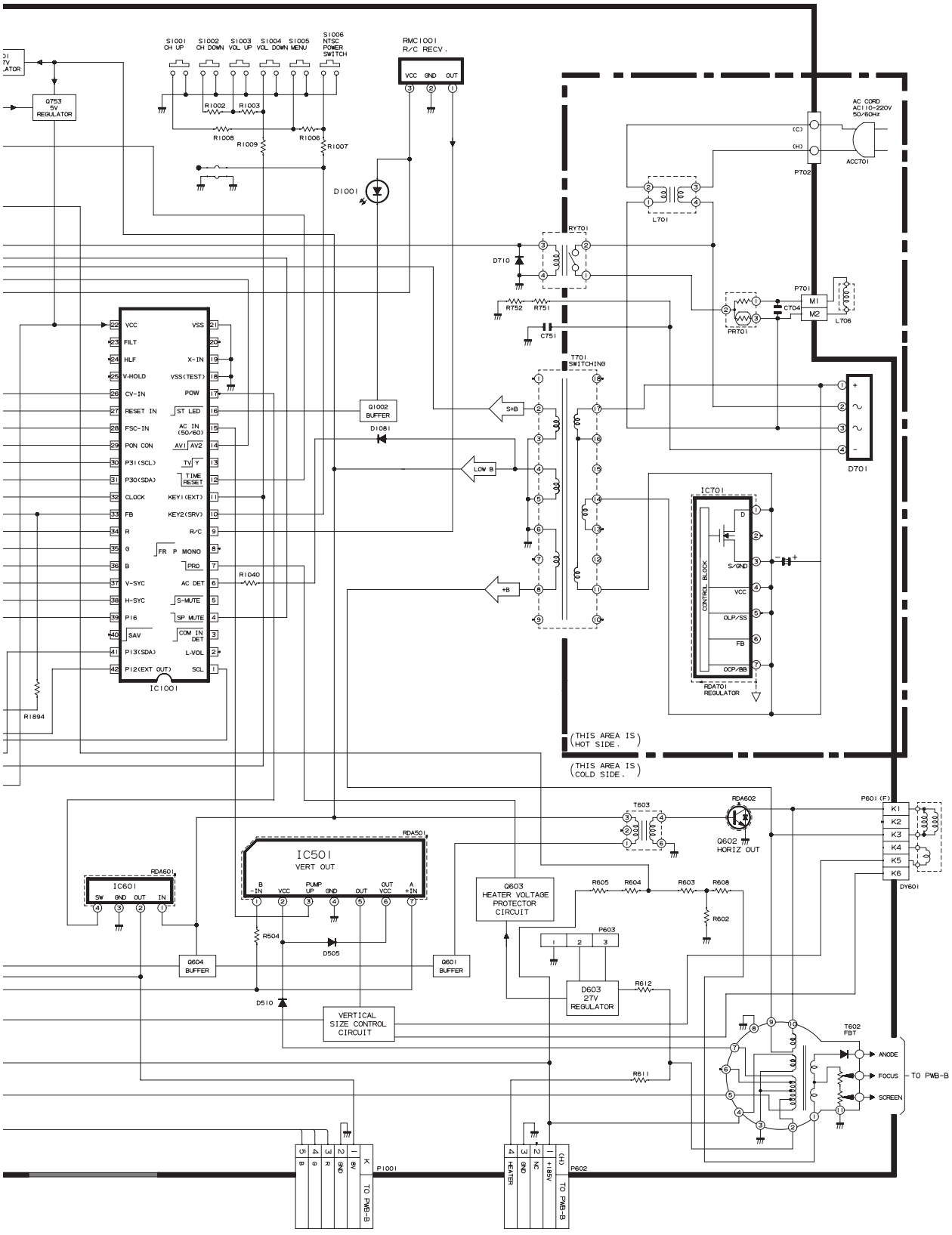


CRT BLOCK DIA GRAM



MAIN BLOCK DIAGRAM





10	11	12	13	14	15	16	17	18	19

DESCRIPTION OF SCHEMATIC DIAGRAM

NOTES:

1. *The unit of resistance "ohm" is omitted. (K=kW=1000W, M=MW)*
2. *All resistors are 1/16 watt, unless otherwise noted.*
3. *All capacitors are mF, unless otherwise noted. (P=pF=mmF)*
4. *(G) indicates ±2% tolerance may be used.*
5. *⏚ indicates line isolated ground.*

VOLTAGE MEASUREMENT CONDITIONS:

1. *All DC voltages are measured with DVM connected between points indicated and chassis ground, line voltage set at 120V AC and all controls set for normal picture unless otherwise indicated.*
2. *All voltages measured with 1000mV B & W or Color signal.*

WAVEFORM MEASUREMENT CONDITIONS:

1. *Photographs taken on a standard gated color bar signal, the tint setting adjusted for proper color. The wave shapes at the red, green and blue cathodes of the picture tube depend on the tint, color level and picture control.*
2. *indicates waveform check points (See chart, waveforms are measured from point indicated to chassis ground.)*

Œ AND SHADED ( ) COMPONENTS = SAFETY RELATED PARTS.
MARK= X-RAY RELATED PARTS.

DRGANNES MARQUES Œ ET HACHRES ( ): PIECES RELATIVES A LA SECURITE.
MARQUE : PIECS RELATIVE AUX RAYONS X.

This circuit diagram is a standard one, printed circuits may be subject to change for product improvement without prior notice.

21V-R70M

MAIN

PWB-A
GP98F0073MJZZ

NOTE>1.THE UNIT OF RESISTANCE "OHM" IS OMITTED
OH=1000 OHM, MA=MEGA OHM).
2.ALL RESISTORS ARE 1/16W WATT UNLESS OTHERWISE NOTED.
3.UNIT OF ALL CAPACITORS ARE F WITH PREFIX SYMBOL
(ie. P, ETC).

⚠AND SHADED<##>COMPONENTS
= SAFETY RELATED PARTS.
⚠ MARK = X-RAY RELATED PARTS.

IC303 AN17883A
IC801 MSI850CF
IC1001 IX4658NJ
IC1003 BR24L04F
IC501 AN5888A VERT OUT
IC5001 KIA78R05A
IC9003 MM1601AN

LINE CORD PLUG IS POLARIZED. THE WIDER BLADE CONNECTS TO THE HOT SIDE OF THE AC LINE.

(THIS AREA IS HOT SIDE.)
(THIS AREA IS COLD SIDE.)

TO PIB-B

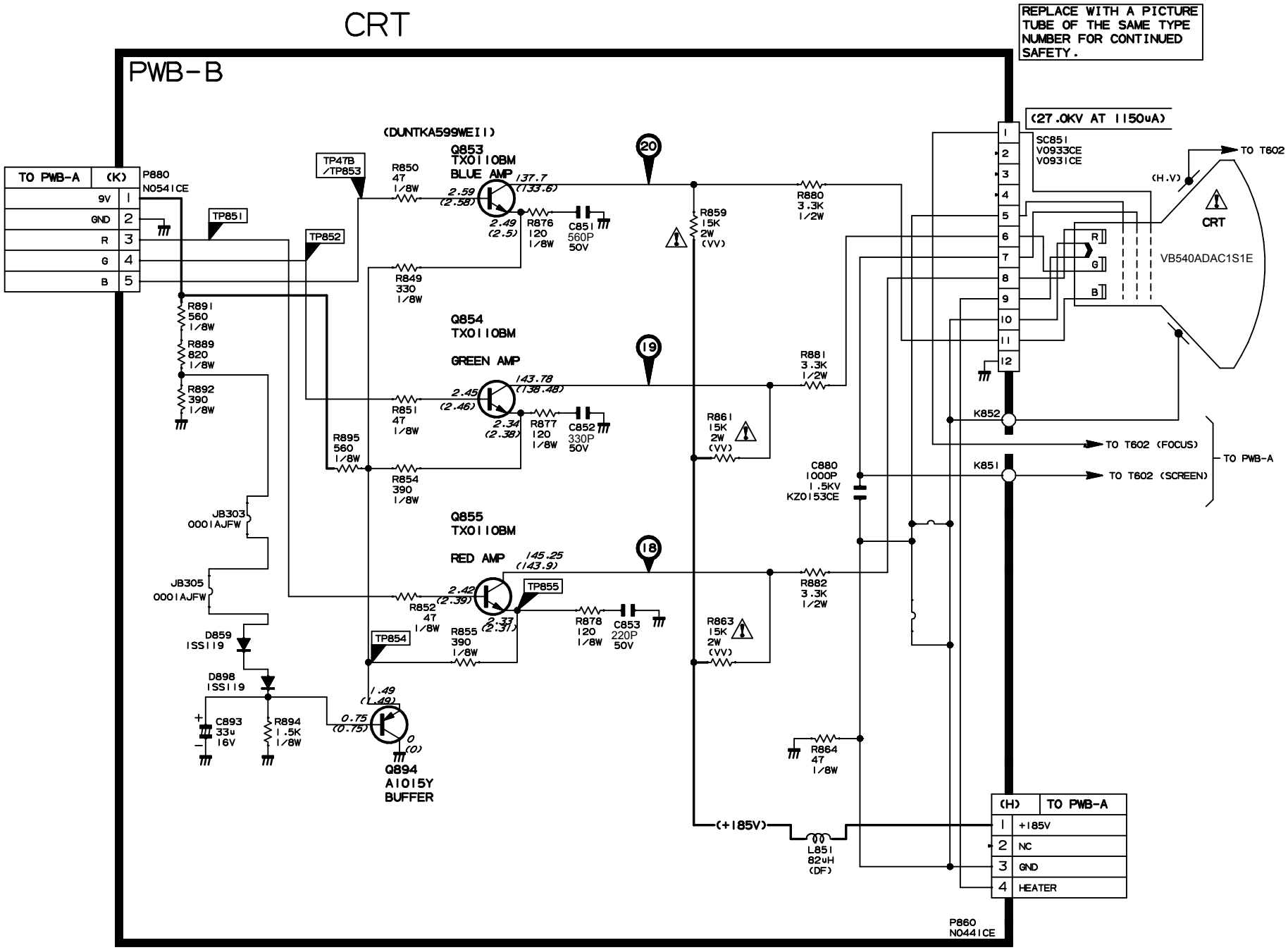
21V-R230S/21V-R70M/21V-R75M/21V-R80M

⚠ AND SHADED(■) COMPONENTS = SAFETY RELATED PARTS.

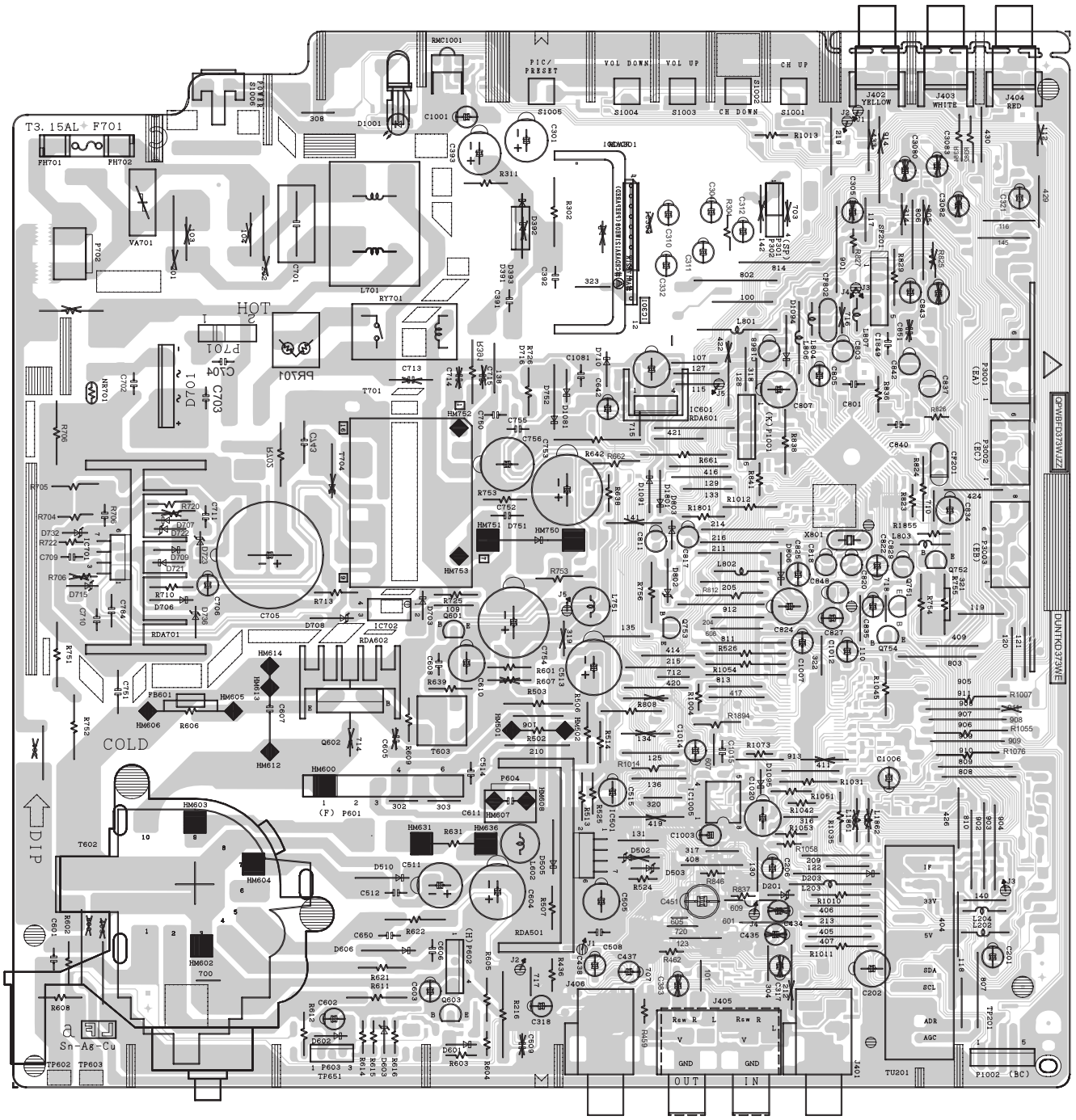
NOTE: 1. THE UNIT OF RESISTANCE "OHM" IS OMITTED (K=1000 OHMS, M=MEGAOHM).
2. THE UNIT OF ALL CAPACITORS ARE F WITH PREFIX SYMBOL (u, P, ETC).

NOTE: ALL DIODES ARE "ISS119 DX0475CE" UNLESS OTHERWISE SPECIFIED.

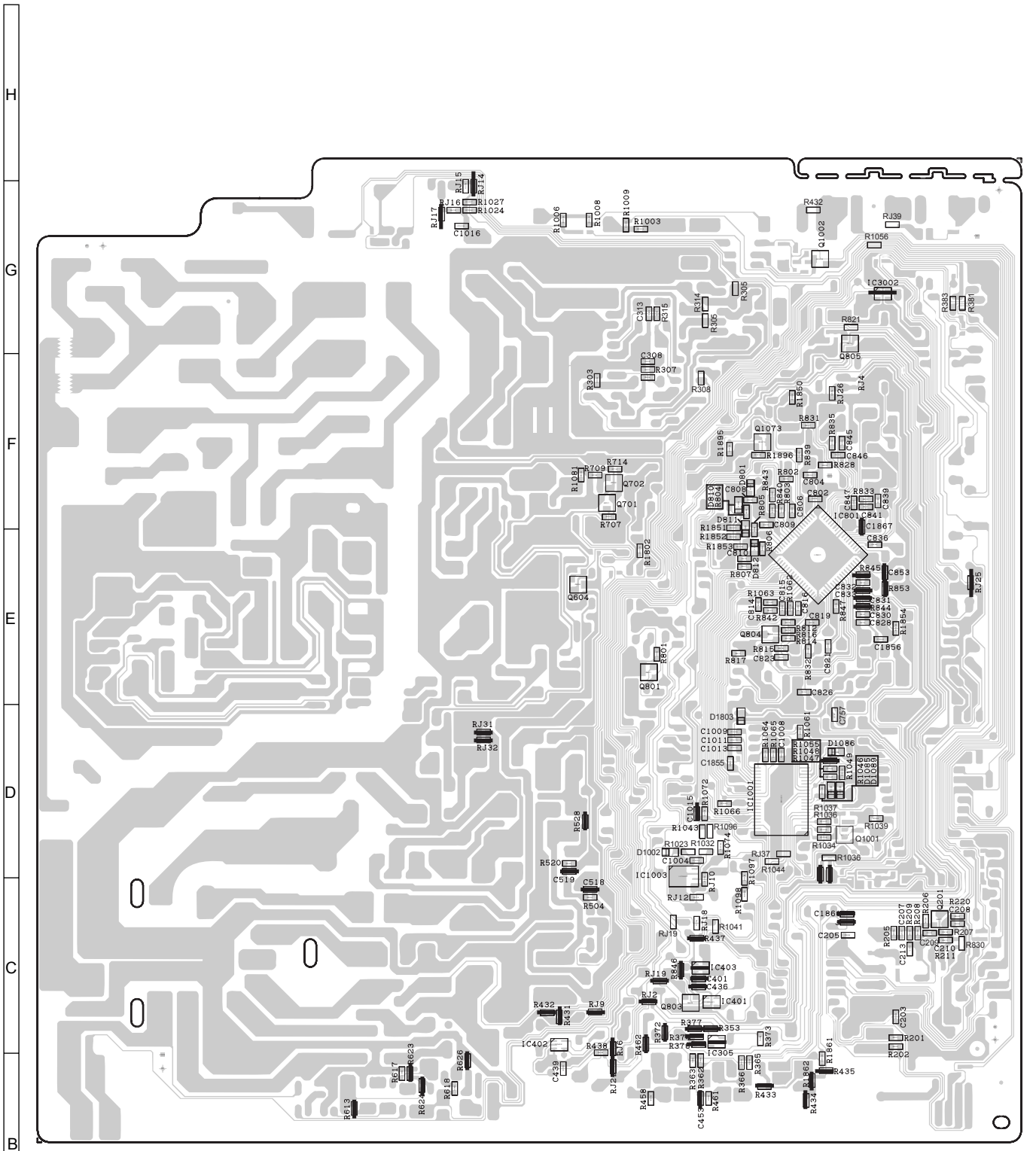
REPLACE WITH A PICTURE TUBE OF THE SAME TYPE NUMBER FOR CONTINUED SAFETY.



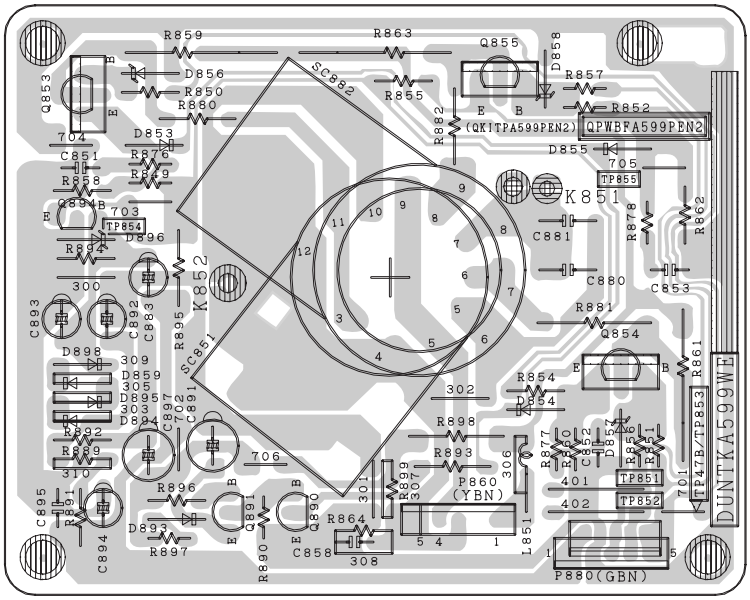
PRINTED WIRING BOARD ASSEMBLIES



PWB-A: MAIN Unit (Wiring Side)



PWB-A: MAIN Unit (Chip Parts Side)



PWB-B: CRT Unit (Wiring Side)

REPLACEMENT PARTS LIST

Replacement parts which have these special safety characteristics identified in this manual; electrical components having such features are identified by ⚠ And shaded areas in the Replacement Parts Lists and Schematic Diagrams. The use of a substitute replacement part which does not have the same safety characteristic as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

▲ MARK: X-RAY RELATED PARTS

Ref. No.	Part No.	Description
PICTURE TUBE		
▲⚠V101	VB540ADAC1S1E	Picture Tube
▲⚠DY601		SKD Type
⚠L706	RCILGA115WJZZ	Degaussing Coil
	EWBC-L640WEV5	CRT Ground Wire
	PMAGF3046CEZZ	Purity Magnet
	MSPRT0001PEFJ	CRT Spring
	PSPAG0017PEZZ	Spacer
	LBNDC0323PJZZ	Wire Holder
PRINTED WIRING BOARD ASSEMBLIES (NOT REPLACEMENT ITEM)		
PWB-A	DUNTKD373WEA6	MAIN Unit
PWB-B	DUNTKA599WEK5	CRT Unit

Ref. No.	Part No.	Description
PWB-A: DUNTKD373WEA6 MAIN UNIT		
TUNER		
NOTE: THE PARTS HERE SHOWN ARE SUPPLIED AS AN ASSEMBLY BUT NOT INDEPENDENTLY.		
⚠TU201	VTUVT1Y5UF201	Tuner
INTEGRATED CIRCUITS		
IC303	VHIAN17823A-1	AN17823A
IC402	VHIMM1501XN-1	MM1501XN
⚠IC501	VHIAN15524A-1	AN15524A
IC601	VHIKA78R09AP1	KA78R09AP
⚠IC701	VHISTRW5453-1	STRW5453
IC801	VHIM61250CF1EQ	M61250CF
IC1001	RH-IXA983WJZZ	IXA983WJ
IC1003	VHIBR24L04F-1	BR24L04F
IC3002	VHIMM1501XN-1	MM1501XN
TRANSISTORS		
Q201	VS2SC2735//1E	2SC2735
Q601	VS2SC2235Y/1E	2SC2235Y
Q602	VSTT2140+++-F	TT2140++
Q603	VS2SC3198-G-1	2SC3198-G
Q604	VS2SC3928AR-1	2SC3928AR
Q751	VS2SD468-C/-1	2SD468-C
Q752	VS2SD468-C/-1	2SD468-C
Q753	VS2SC3198-G-1	2SC3198-G
Q754	VS2SD468-C/-1	2SD468-C
Q801	VS2SC3928AR-1	2SC3928AR
Q804	VS2PB709AR/-1	2SB709AR
Q805	VS2PB709AR/-1	2SB709AR
Q1002	VS2SC3928AR-1	2SC3928AR
Q1073	VS2SC3928AR-1	2SC3928AR
DIODES		
D201	RH-EX0676GEZZ	Zener, EX0676GE
D203	VHD1SS119//-1	D1SS119
D391	RH-DX0302CEZZ	DX0302CE
D503	RH-EX0612GEZZ	Zener, EX0612GE
D505	RH-DX0441CEZZ	DX0441CE
D510	RH-DX0131CEZZ	DX0131CE
D601	VHD1SS119//-1	D1SS119
D602	VHD1SS244//-1	1SS244
D603	RH-EX0667GEZZ	Zener, EX0667GE
D606	RH-DX0131CEZZ	DX0131CE
⚠D701	RH-DX0476CEZZ	DX0476CE
D706	RH-DX0066GEZZ	DX0066GE
D707	RH-DX0066GEZZ	DX0066GE
D709	RH-DX0066GEZZ	DX0066GE
D710	VHD1SS119//-1	D1SS119
D715	RH-EX0615GEZZ	Zener, EX0615GE
D721	RH-DX0066GEZZ	DX0066GE
D722	RH-EX0669GEZZ	Zener, EX0669GE
D723	RH-EX0640GEZZ	Zener, EX0640GE
D732	RH-EX0626GEZZ	Zener, EX0626GE

Ref. No.	Part No.	Description
PWB-A: DUNTKD373WEA6 MAIN UNIT (Continued)		
D736	RH-EX0680GEZZ	Zener, EX0680GE
D751	RH-DXA044WJZZ	DXA044WJ
D752	RH-DX0247CEZZ	DX0247CE
D801	RH-EX1393CEZZ	Zener, EX1393CE
D802	RH-EX0630GEZZ	Zener, EX0630GE
D803	VHD1SS119//-1	D1SS119
D806	VHD1SS119//-1	D1SS119
D810	RH-EX0263TAZZ	Zener, EX0263TA
D811	RH-EX0263TAZZ	Zener, EX0263TA
D812	RH-EX0263TAZZ	Zener, EX0263TA
D1001	RH-PX0013PEZZ	LED, Power
D1081	VHD1SS119//-1	D1SS119
D1085	RH-EX1393CEZZ	Zener, EX1393CE
D1086	RH-EX1393CEZZ	Zener, EX1393CE
D1089	RH-EX1393CEZZ	Zener, EX1393CE
D1091	VHD1SS119//-1	D1SS119
D1094	VHD1SS119//-1	D1SS119
D1095	VHD1SS119//-1	D1SS119
D1801	VHD1SS119//-1	D1SS119
D1802	RH-EX1393CEZZ	Zener, EX1393CE
D1803	RH-EX1393CEZZ	Zener, EX1393CE
VA701	RH-VX0073CEZZ	Varistor
	PACKAGED CIRCUITS	
NR701	RH-HXA013WJZZ	Thermistor
⚠PR701	RMPTPA016WJZZ	Packaged Circuit
X801	RCRSAA010WJZZ	Crystal Oscillator
	FILTERS AND COILS	
CF201	RFILC0447CEZZ	Ceramic Filter
CF802	RFILC0446CEZZ	Ceramic Filter
L203	VP-DF270K0000	Peaking 27 μH
L204	VP-XF1R2K0000	Peaking 1.2 μH
⚠L701	RCILFA187WJZZ	Coil
L751	RCILP0179CEZZ	Coil
L801	VP-DF100K0000	Peaking 10 μH
L802	VP-DF100K0000	Peaking 10 μH
L803	VP-DF100K0000	Peaking 10 μH
L804	VP-XF150K0000	Peaking 15 μH
L806	VP-DF100K0000	Peaking 10 μH
L807	VP-XF1R2K0000	Peaking 1.2 μH
SF201	RFILCA045WJPZ	SAW Filter
	TRANSFORMERS	
▲⚠T602	RTRNFA137WJZZ	H-Volt Transformer
⚠T603	RTRNZA058WJZZ	Transformer
⚠T701	RTRNWA216WJZZ	Transformer
	CAPACITORS	
	[EL. …Electrolytic, M-Poly. …Metalized Polypro Film]	
C201	VCEA0A1CW476M	47, 16V EL.
C202	VCEA0A0JW108M	1000, 6.3V EL.
C203	VCKYCY1HF103Z	0.01, 50V Ceramic
C205	VCKYCY1HF103Z	0.01, 50V Ceramic
C206	VCEA0A1HW106M	10, 50V EL.
C207	VCKYCY1HF103Z	0.01, 50V Ceramic
C208	VCKYCY1HF103Z	0.01, 50V Ceramic
C209	VCKYCY1HF103Z	0.01, 50V Ceramic
C210	VCKYCY1HF103Z	0.01, 50V Ceramic
C213	VCKYCY1HB102K	1000p, 50V Ceramic
C301	VCEA0A1CW477M	470, 16V EL.
C304	VCEA9M1CW106M	10, 16V EL.
C305	VCEA0A1HW474M	0.47, 50V EL.
C310	VCEA0A1HW105M	1, 50V EL.
C312	VCEA0A1HW335M	3.3, 50V EL.
C313	VCKYCY1HB822K	8200, 50V Ceramic
C318	VCEA0A1CW107M	100, 16V EL.
C322	VCEA0A1HW105M	1, 50V EL.
C391	VCKYPA1HB102K	1000p, 50V Ceramic
C392	VCQYTA1HM103J	0.01, 50V Ceramic
C393	VCEA0A1EW108M	1000, 25V EL.
C437	VCE9GA1HW106M	10, 50V EL.
C438	VCEA0A1CW106M	10, 16V EL.
C439	VCKYCY1HF103Z	0.01, 50V Ceramic
C505	VCEA0A1HW107M	100, 50V EL.
C508	VCFYAA2AA224J	0.22, 100V M-Poly.
C511	VCEA0A1VW477M	470, 35V EL.
C512	VCKYPA2HB102K	1000p, 500V Ceramic
C513	RC-EZA332WJZZ	EZA332WJ
C515	VCEACA1HC335J	3.3, 50V EL.
C601	VCQYTA1HM563J	0.056, 50V Mylar
C602	VCEA0A1HW475M	4.7, 50V EL.
C603	VCEA0A1HW105M	1, 50V EL.
C604	VCEA0A2EW476M	47, 250V EL.
C606	VCKYPA2HB102K	1000p, 500V Ceramic
▲⚠C607	VCFPVC3ZA772H	7700p, 1800V M-Poly.
C608	VCFYFA1HA563J	0.056, 50V Mylar
C610	VCEA0A1EW227M	220, 25V EL.
C611	VCFPVC2DB474J	0.47, 200V M-Poly
C642	VCEA0A1EW476M	47, 25V EL.
C643	VCEA0A1CW477M	470, 16V EL.
C650	VCKYPA2HB101K	100p, 500V Ceramic
⚠C701	RC-FZ029SCEZZ	0.22, 275V M-Poly.
C702	RC-KZ0029CEZZ	0.01, 250V Ceramic
C703	RC-KZ0029CEZZ	0.01, 250V Ceramic
C704	RC-KZ0029CEZZ	0.01, 250V Ceramic
⚠C705	RC-EZA533WJZZ	220, 400V EL.
C706	VCEA0A1HW476M	47, 50V EL.
C708	VCKYPA1HB221K	220p, 50V Ceramic
C709	VCKYPA1HB103K	0.01, 50V Ceramic
C710	VCQYTA1HM222J	2200p, 50V Mylar
C711	VCKYPA1HB222K	2200p, 50V Ceramic
C720	VCFYFA1HA105J	1, 50V M-Poly
⚠C750	VCKYPA2HB102K	1000p, 500V Ceramic
⚠C751	RC-KZ0102GEZZ	680p, AC250V Porcelain
C752	VCKYPH3DB561K	560p, 2kV Ceramic
C753	RC-EZA523WJZZ	100, 160V EL.
C754	RC-EZA522WJZZ	33, 160V EL.
C755	VCQYTA1HM103J	0.01, 50V Mylar
C756	VCEA0A1EW228M	2200, 25V EL.
C757	VCKYCY1HB471K	470p, 50V Ceramic
C784	VCKYPH3DB561K	560p, 200V Ceramic
C801	VCFYFA1HA105J	1, 50V M-Poly.
C802	VCKYCY1HF103Z	0.01, 50V Ceramic
C803	VCEA9M1CW476M	47, 16V EL.
C804	VCKYCY1HF103Z	0.01, 50V Ceramic

Ref. No.	Part No.	Description
PWB-A: DUNTKD373WEA6 MAIN UNIT (Continued)		
C805	VCEA0A1HW105M	1, 50V EL.
C806	VCKYCY1HF103Z	0.01, 50V Ceramic
C807	VCEA0A1CW337M	330, 16V EL.
C808	VCKYCY1HF103Z	0.01, 50V Ceramic
C809	VCKYCY1HF103Z	0.01, 50V Ceramic
C810	VCKYCY1HF103Z	0.01, 50V Ceramic
C811	VCEA9M1CW106M	10, 16V EL.
C814	VCKYCY1HF103Z	0.01, 50V Ceramic
C815	VCKYCY1HF103Z	0.01, 50V Ceramic
C816	VCKYCY1EF104Z	0.1, 25V Ceramic
C817	VCEA9M1CW107M	100, 16V EL.
C818	VCEA9M1HW475M	4.7, 50V EL.
C819	VCCCCY1HH220J	22p, 50V Ceramic
C820	VCEA9M1HW474M	0.47, 50V EL.
C821	VCKYCY1HF153Z	0.015, 50V Ceramic
C822	VCE9GA1HW105M	1, 50V EL.
C823	VCKYCY1EF104Z	0.1, 25V Ceramic
C824	VCEA0A1CW337M	330, 16V EL.
C825	VCE9GA1HW105M	1, 50V EL.
C826	VCKYCY1HF103Z	0.01, 50V Ceramic
C827	VCEA0A1CW476M	47, 16V EL.
C828	VCKYCY1HF103Z	0.01, 50V Ceramic
C829	VCEA9M1CW476M	47, 16V EL.
C830	VCKYCY1CF224Z	0.22, 16V Ceramic
C832	VCKYCY1CF224Z	0.22, 16V Ceramic
C834	VCEA0A1CW107M	100, 16V EL.
C835	VCEA0A1CW106M	10, 16V EL.
C836	VCKYCY1HF103Z	0.01, 50V Ceramic
C837	VCEA0A1HW105M	1, 50V EL.
C838	VCEA0A1CW106M	10, 16V EL.
C839	VCKYCY1HB332K	3300p, 50V Ceramic
C840	VCFYFA1HA105J	1, 50V M-Poly.
C841	VCCCCY1HH101J	100p, 50V Ceramic
C842	VCEA0A1HW474M	0.47, 50V EL.
C843	VCEA0A1HW105M	1, 50V EL.
C845	VCKYCY1CF224Z	0.22, 16V Ceramic
C846	VCKYCY1HF103Z	0.01, 50V Ceramic
C847	VCCCCY1HH220J	22p, 50V Ceramic
C848	VCEA9M1HW105M	1, 50V EL.
C1001	VCEA0A0JW107M	100, 6.3V EL.
C1003	VCEA0A1CW226M	22, 16V EL.
C1004	VCKYCY1CF474Z	0.47, 16V Ceramic
C1007	VCEA0A1CW107M	100, 16V EL.
C1008	VCKYCY1HF103Z	0.01, 50V Ceramic
C1009	VCKYCY1HF103Z	0.01, 50V Ceramic
C1011	VCKYCY1HB221K	220p, 50V Ceramic
C1012	VCEA0A1HW105M	1, 50V EL.
C1013	VCKYCY1HB102K	1000p, 50V Ceramic
C1014	VCE9GA1HW475M	4.7, 50V EL.
C1015	VCCCPA1HH101J	100p, 50V Ceramic
C1016	VCKYCY1EF104Z	0.1, 25V Ceramic
C1020	VCEA0A0JW477M	470, 6.3V EL.
C1081	VCQYTA1HM104J	0.1, 50V Mylar
C1849	VCFYFA1HA223J	0.022, 50V M-Poly.
C1855	VCKYCY1HB561K	560p, 50V Ceramic
C1856	VCKYCY1HB102K	1000p, 50V Ceramic
C1868	VCEA9M1CW336M	33, 16V EL.
C3080	VCEA0A1CW107M	100, 16V EL.
C3081	VCKYCY1HB103K	0.01, 50V Ceramic
C3083	VCEA0A1CW106M	10, 16V EL.

RESISTORS

[M-Ox. …Metal Oxide, M-Film …Metal Film]

Ref. No.	Part No.	Description
RJ15	VRS-CY1JF000J	0, 1/16W M-Ox.
RJ16	VRS-CY1JF000J	0, 1/16W M-Ox.
RJ18	VRS-CY1JF000J	0, 1/16W M-Ox.
RJ19	VRS-CY1JF000J	0, 1/16W M-Ox.
RJ26	VRS-CY1JF000J	0, 1/16W M-Ox.
RJ37	VRS-CY1JF000J	0, 1/16W M-Ox.
RJ40	VRS-CY1JF000J	0, 1/16W M-Ox.
R201	VRS-CY1JF101J	100, 1/16W M-Ox.
R202	VRS-CY1JF101J	100, 1/16W M-Ox.
R205	VRS-CY1JF680J	68, 1/16W M-Ox.
R206	VRS-CY1JF122J	1.2k, 1/16W M-Ox.
R207	VRS-CY1JF221J	220, 1/16W M-Ox.
R208	VRS-CY1JF331J	330, 1/16W M-Ox.
R209	VRS-CY1JF392J	3.9k, 1/16W M-Ox.
R216	VRS-VV3LB333J	33k, 3W, M-Ox.
R220	VRS-CY1JF221J	220, 1/16W M-Ox.
R301	VRD-RA2BE102J	1k, 1/8W Carbon
R302	VRN-VV3DB2R2J	2.2, 2W M-Film
R303	VRS-CY1JF473J	47k, 1/16W M-Ox.
R304	VRD-RA2BE683J	68k, 1/8W Carbon
R305	VRS-CY1JF274J	270k, 1/16W M-Ox.
R311	VRD-RA2BE103J	10k, 1/8W Carbon
R314	VRS-CY1JF332J	3.3k, 1/16W M-Ox.
R315	VRS-CY1JF272J	2.7k, 1/16W M-Ox.
R365	VRS-CY1JF564J	560k, 1/16W M-ox.
R366	VRS-CY1JF332J	3.3k, 1/16W M-Ox.
R391	VRN-VV3ABR22J	0.22, 1W M-Film
R436	VRD-RA2BE101J	100, 1/8W Carbon
R461	VRS-CY1JF750J	75, 1/16W M-Ox.
R462	VRD-RA2BE101J	100, 1/8W Carbon
R501	VRD-RA2BE103J	10k, 1/8W Carbon
R503	VRN-VV3DB1R5J	1.5, 2W M-Film
R504	VRS-CY1JF222J	2.2, 1/16W M-Ox.
R506	VRS-VV3AB331J	330, 1W M-Ox.
R507	VRD-RM2HD1R0J	1, 1/2W Carbon
R513	VRD-RM2HD333J	33k, 1/2W Carbon
R514	VRD-RM2HD562J	5.6k, 1/2W Carbon
R520	VRS-CY1JF133J	13k, 1/16W M-Ox.
R524	VRD-RA2BE103J	10k, 1/8W Carbon
R525	VRD-RA2BE122J	1.2k, 1/8W Carbon
R526	VRD-RA2BE101J	100, 1/8W Carbon
R601	VRD-RM2HD680J	68, 1/2W Carbon
R602	VRD-RA2BE393J	39k, 1/8W Carbon
R603	VRD-RA2BE223J	22k, 1/8W Carbon
R604	VRD-RA2BE473J	47k, 1/8W Carbon
R605	VRD-RM2HD104J	100k, 1/2W Carbon
R606	VRN-VV3LBR18J	0.18, 3W M-Film
R607	VRD-RM2HD680J	68, 1/2W Carbon
⚠R608	VRD-RM2HD102J	1k, 1/2W Carbon
⚠R609	VRD-RM2HD270J	27, 1/2W Carbon
⚠R611	VRN-VV3AB1R2J	1.2, 1W M-Film
R612	VRD-RM2HD270J	27, 1/2W Carbon
R614	VRD-RA2BE154J	150k, 1/8W Carbon
R615	VRD-RA2BE102J	1k, 1/8W Carbon

Ref. No.	Part No.	Description
PWB-A: DUNTKD373WEA6 MAIN UNIT (Continued)		
R616	VRD-RA2BE102J	1k, 1/8W Carbon
R617	VRS-CY1JF123J	12k, 1/16W M-Ox.
R618	VRS-CY1JF103J	10k, 1/16W M-Ox.
R621	VRS-SV2HC100J	10, 1/2W M-Film
R622	VRS-VV3DB682J	6.8k, 2W M-Ox.
R631	VRS-KT3LB391J	390, 3W M-Ox.
R637	VRD-RA2BE331J	330, 1/8W Carbon
R638	VRD-RA2BE181J	180, 1/8W Carbon
R639	VRD-RM2HD151J	150, 1/2W Carbon
R642	VRN-VV3DB1R0J	1, 2W Carbon
R661	VRD-RA2BE102J	1k, 1/8W Carbon
R662	VRD-RA2BE103J	10k, 1/8W Carbon
R702	VRN-VV3DB124J	120k, 2W M-Film
R704	VRD-RA2BE221J	220, 1/8W Carbon
R705	VRN-VV3DBR82J	0.82, 2W M-Film
R706	VRN-VV3DBR22J	0.22, 2W M-Film
R710	VRD-RM2HD1R0J	1, 1/2W Carbon
R720	VRD-RA2EE472J	4.7k, 1/4W Carbon
R722	VRD-RA2BE153J	15k, 1/8W Carbon
R726	VRN-SV2HCR47J	0.47, 1/2W M-Film
R733	VRD-RA2BE273J	27k, 1/8W Carbon
⚠R751	RR-HZ0014GEZZY	12M, 1W Solid
R753	VRD-RM2HD124J	120k, 1/2W Carbon
R754	VRN-VV3AB8R2J	8.2, 1W M-Film
R756	VRS-VV3DB121J	120, 2W M-Ox.
R801	VRS-CY1JF561J	560, 1/16W M-Ox.
R802	VRS-CY1JF682J	6.8k, 1/16W M-Ox.
R803	VRS-CY1JF103J	10k, 1/16W M-Ox.
R804	VRS-CY1JF222J	2.2k, 1/16W M-Ox.
R805	VRS-CY1JF222J	2.2k, 1/16W M-Ox.
R806	VRS-CY1JF222J	2.2k, 1/16W M-Ox.
R807	VRS-CY1JF222J	2.2k, 1/16W M-Ox.
R808	VRD-RA2BE273J	27k, 1/8W Carbon
R812	VRD-RA2BE101J	100, 1/8W Carbon
R814	VRS-CY1JF473J	47k, 1/16W M-Ox.
R815	VRS-CY1JF473J	47k, 1/16W M-Ox.
R816	VRS-CY1JF223J	22k, 1/16W M-Ox.
R817	VRS-CY1JF473J	47k, 1/16W M-Ox.
R821	VRS-CY1JF000J	0, 1/16W M-ox.
R823	VRD-RA2BE101J	100, 1/8W Carbon
R824	VRD-RA2BE101J	100, 1/8W Carbon
R825	VRD-RA2BE101J	100, 1/8W Carbon
R827	VRD-RA2BE472J	4.7k, 1/8W Carbon
R828	VRS-CY1JF471J	470, 1/16W M-Ox.
R829	VRD-RA2BE472J	4.7k, 1/8W Carbon
R830	VRS-CY1JF393J	39k, 1/16W M-Ox.
R831	VRS-CY1JF271J	270, 1/16W M-Ox.
R832	VRS-CY1JF822J	8.2k, 1/16W M-Ox.
R833	VRS-CY1JF221J	220, 1/16W M-Ox.
R835	VRS-CY1JF332J	3.3k, 1/16W M-Ox.
R836	VRD-RA2BE470J	47, 1/8W Carbon
R838	VRD-RA2BE105J	1M, 1/8W Carbon
R839	VRS-CY1JF101J	100, 1/16W M-Ox.
R840	VRS-CY1JF124J	120k, 1/16W M-Ox.
R841	VRD-RA2BE821J	820, 1/8W Carbon
R842	VRS-CY1JF471J	470, 1/16W M-Ox.
R843	VRS-CY1JF103J	10k, 1/16W M-Ox.
R847	VRS-CY1JF475J	4.7M, 1/16W M-Ox.
R1002	VRS-CY1JF183J	18k, 1/16W M-Ox.
R1003	VRS-CY1JF822J	8.2k, 1/16W M-Ox.
R1004	VRD-RA2BE101J	100, 1/8W Carbon
R1006	VRS-CY1JF822J	8.2k, 1/16W M-Ox.
R1007	VRD-RA2BE103J	10k, 1/8W Carbon
R1008	VRS-CY1JF183J	18k, 1/16W M-Ox.
R1009	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1011	VRD-RA2BE101J	100, 1/8W Carbon
R1013	VRD-RA2BE391J	390, 1/8W Carbon
R1023	VRS-CY1JF271J	270, 1/16W M-Ox.
R1024	VRS-CY1JF101J	100, 1/16W M-Ox.
R1027	VRS-CY1JF104J	100k, 1/16W M-Ox.
R1031	VRD-RA2BE101J	100, 1/8W Carbon
R1032	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1034	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1035	VRD-RA2BE101J	100, 1/8W Carbon
R1036	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1040	VRD-RA2BE273J	27k, 1/8W Carbon
R1041	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1042	VRD-RA2BE101J	100, 1/8W Carbon
R1043	VRS-CY1JF104J	100k, 1/16W M-Ox.
R1044	VRS-CY1JF101J	100, 1/16W M-Ox.
R1045	VRD-RA2BE101J	100, 1/8W Carbon
R1046	VRS-CY1JF101J	100, 1/16W M-Ox.
R1047	VRS-CY1JF183J	18k, 1/16W M-Ox.
R1048	VRS-CY1JF101J	100, 1/16W M-Ox.
R1049	VRS-CY1JF183J	18k, 1/16W M-Ox.
R1051	VRD-RA2BE473J	47k, 1/8W Carbon
R1054	VRD-RA2BE101J	100, 1/8W Carbon
R1055	VRD-RA2BE332J	3.3k, 1/8W Carbon
R1056	VRS-CY1JF332J	3.3k, 1/16W M-Ox.
R1058	VRD-RA2BE103J	10k, 1/8W Carbon
R1061	VRS-CY1JF102J	1k, 1/16W M-Ox.
R1062	VRS-CY1JF105J	1M, 1/16W M-Ox.
R1063	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1064	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1065	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1066	VRS-CY1JF561J	560, 1/16W M-Ox.
R1072	VRS-CY1JF221J	220, 1/16W M-Ox.
R1073	VRD-RA2BE101J	100, 1/8W Carbon
R1074	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1076	VRD-RA2BE102J	1k, 1/8W Carbon
R1081	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1096	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1097	VRS-CY1JF472J	4.7k, 1/16W M-Ox.
R1098	VRS-CY1JF104J	100k, 1/16W M-Ox.
R1801	VRD-RA2BE222J	2.2k, 1/8W Carbon
R1802	VRS-CY1JF124J	120k, 1/16W M-Ox.
R1850	VRS-CY1JF472J	4.7k, 1/16W M-Ox.
R1851	VRS-CY1JF221J	220, 1/16W M-Ox.
R1852	VRS-CY1JF221J	220, 1/16W M-Ox.
R1853	VRS-CY1JF221J	220, 1/16W M-Ox.

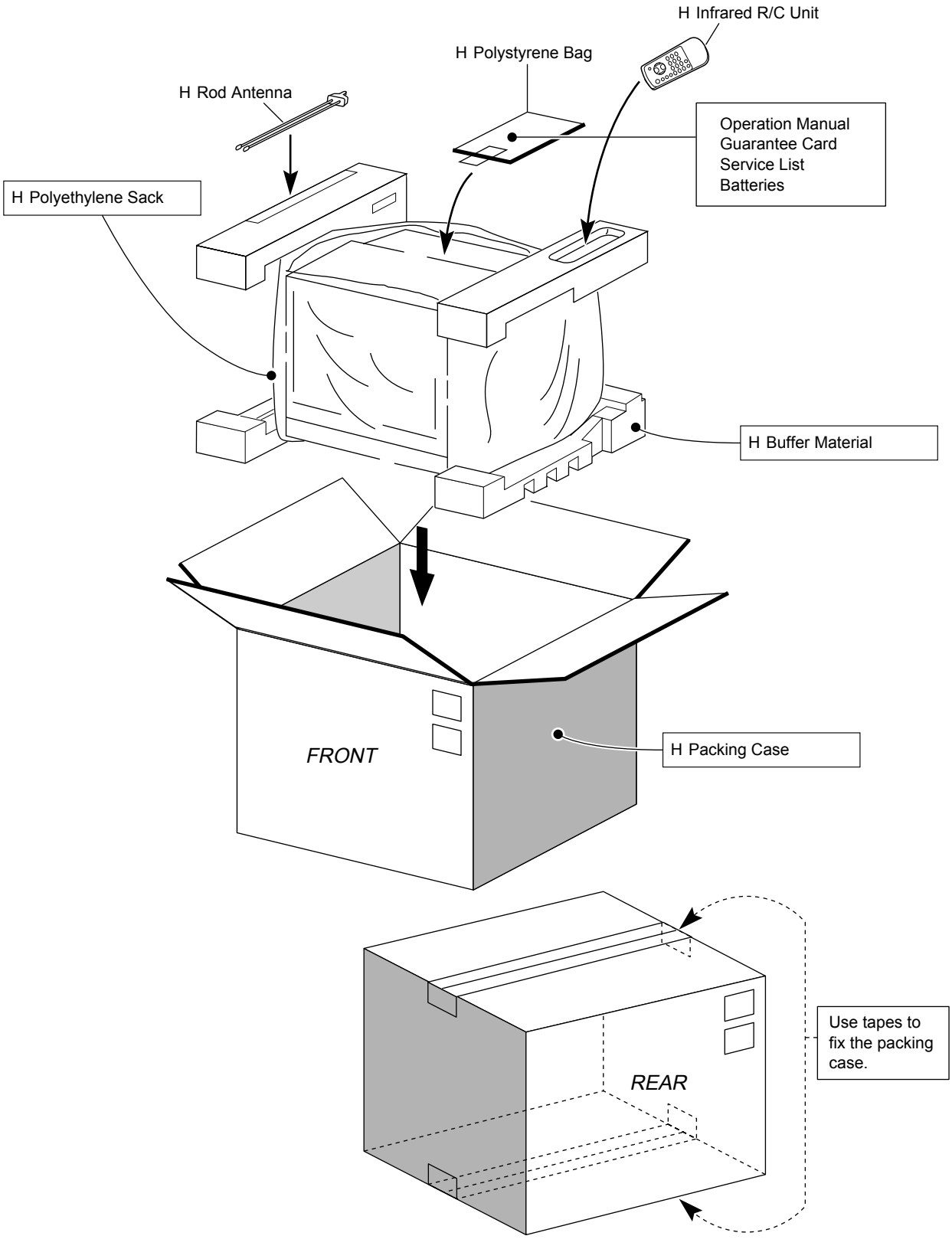
Ref. No.	Part No.	Description
PWB-A: DUNTKD373WEA6 MAIN UNIT (Continued)		
R1854	VRS-CY1JF103J	10k, 1/16W M-Ox.
R1855	VRD-RA2BE122J	1.2k, 1/8W Carbon
R1894	VRD-RA2BE103J	10k, 1/8W Carbon
R1895	VRS-CY1JF473J	47k, 1/16W Carbon
R1896	VRS-CY1JF473J	47k, 1/16W Carbon
SWITCHES		
S1001	QSW-K0003AJZZ	Switch, CH-Up
S1002	QSW-K0003AJZZ	Switch, CH-Down
S1003	QSW-K0003AJZZ	Switch, VOL-Up
S1004	QSW-K0003AJZZ	Switch, VOL-Down
S1005	QSW-K0003AJZZ	Switch, MENU
S701	QSW-P0612CEZZ	Switch, Power
MISCELLANEOUS PARTS		
⚠ F701	QFS-C3225CEZZ	Fuse, T3.15A
⚠ FH701	QFSHD1013CEZZ	Fuse Holder
⚠ FH702	QFSHD1014CEZZ	Fuse Holder
J405	QJAKFA004WJZZ	Rear AV IN
P301	QPLGN0241CEZZ	Plug, 2-pin (S)
P601	QPLGN0660CEZZ	Plug, 6-pin (F)
P602	QPLGN0441CEZZ	Plug, 4-pin (H)
P603	QPLGN0341CEZZ	Plug, 3-pin (TP651~3)
P701	QPLGN0260CEZZ	Plug, 2-pin (M)
P702	QPLGN0269GEZZ	Plug, 2-pin
P1001	QPLGNA110WJZZ	Plug, 5-pin (K)
P1002	QPLGNA110WJZZ	Plug, 5-pin (BC)
RDA301	PRDARA121WJFW	S-Out Heatsink
RDA501	PRDARA120WJFW	V-Out Heatsink
RDA601	PRDARA181WJFW	IC601 Heatsink
RDA602	PRDARA361WJFW	Horizontal Heatsink
RDA701	PRDARA119WJFW	Power Heatsink
RMC1001	RRMCUA022WJZZ	R/C Receiver
RY701	RRLYJ0089CEZZ	Relay
	LHLDP1066PE00	LED Holder
	LHLDW1047PEZZ	Wire Holder
	LX-BZ3049GEF7	Screw
	LX-BZ3100CEF7	Screw

Ref. No.	Part No.	Description
PWB-B: DUNTKA599WEK5 CRT UNIT		
TRANSISTORS		
Q853	RH-TX0110BMZZ	TX0110BM
Q854	RH-TX0110BMZZ	TX0110BM
Q855	RH-TX0110BMZZ	TX0110BM
Q894	VS2SA1015Y/1E	2SA1015Y
DIODES		
D859	VHD1SS119//-1	D1SS119
D898	VHD1SS119//-1	D1SS119
COIL		
L851	VP-MK820K0000	Peaking 82 μH
CAPACITORS *[EL. …Electrolytic]*		
C851	VCKYPA1HB561K	560p, 50V Ceramic
C852	VCKYPA1HB331K	330p, 50V Ceramic
C853	VCKYPA1HB221K	220p, 50V Ceramic
C880	RC-KZ0153CEZZ	0.001, 3.15kV Ceramic
C893	VCEA0A1CW336M	33, 16V EL.
RESISTORS *[M-Ox. …Metal Oxide]*		
R849	VRD-RA2BE331J	330, 1/8W Carbon
R850	VRD-RA2BE470J	47, 1/8W Carbon
R851	VRD-RA2BE470J	47, 1/8W Carbon
R852	VRD-RA2BE470J	47, 1/8W Carbon
R854	VRD-RA2BE391J	390, 1/8W Carbon
R855	VRD-RA2BE391J	390, 1/8W Carbon
⚠ R859	VRS-VV3DB153J	15k, 2W M-Ox.
⚠ R861	VRS-VV3DB153J	15k, 2W M-Ox.
⚠ R863	VRS-VV3DB153J	15k, 2W M-Ox.
R864	VRD-RA2BE470J	47, 1/8W Carbon
R876	VRD-RA2BE121J	120, 1/8W Carbon
R877	VRD-RA2BE121J	120, 1/8W Carbon
R878	VRD-RA2BE121J	120, 1/8W Carbon
R880	VRD-RM2HD332J	3.3k, 1/2W Carbon
R881	VRD-RM2HD332J	3.3k, 1/2W Carbon
R882	VRD-RM2HD332J	3.3k, 1/2W Carbon
R889	VRD-RA2BE821J	820, 1/8W Carbon
R891	VRD-RA2BE561J	560, 1/8W Carbon
R892	VRD-RA2BE391J	390, 1/8W Carbon
R894	VRD-RA2BE152J	1.5k, 1/8W Carbon
R895	VRD-RA2BE561J	560, 1/8W Carbon
MISCELLANEOUS PARTS		
P860	QPLGN0441CEZZ	Plug, 4-pin (H)
P880	QPLGNA110WJZZ	Plug, 5-pin (K)
SC851	QSOCVA023WJZZ	CRT Socket

Ref. No.	Part No.	Description
	MISCELLANEOUS PARTS	
⚠	QACCU0210PJZZ	AC Cord
	VSP9050PA02WA	Speaker
	LBNDC0001PFZZ	Wire Holder
	LHLDW1003PEZZ	Wire Holder
	LHLDW1047PEZZ	Wire Holder
	LHLDW1060PEZZ	Wire Holder
	LHLDZ0063PEZZ	H/V Holder
	QCNW-F275WJZZ	"YBN" Wire
	QCNW-F276WJZZ	"GBN" Wire
	QPGV-0410PJZZ	Speaker Wire
	TLABHA138WJZZ	Bar Code Sticker
	TLABMC610WJZZ	Model Label
	TLABN0106PFZZ	Serial No. Sticker
	XTRSD60P35000	CRT Screw
	XWHSD75-15000	CRT Washer
	SUPPLIED ACCESSORIES	
	QANTD2001PJZZ	Dipole Antenna
	RRMCGA257WJSB	Remote Control
	RTRNZA125WJZZ	Antenna Adaptor
	TINSSA003WJN1	Operation Manual
	UBATC0001PJZZ	AA SHD Battery
	PACKING PARTS	
	(NOT REPLACEMENT ITEMS)	
	SPAKCD622WJZZ	Packing Case
	SPAKAA323WJZZ	P-Add Top
	SPAKAA324WJZZ	P-Add Bottom
	SSAKA0172PFZZ	Polybag
	SSAKH0207PJZZ	Polybag for Unit
	CABINET PARTS	
	CCABAB162WEA0	Front Cab Assy
	GCABAB162WJSA	Front Cabinet
	HBDGB0206PJSA	Sharp Badge
	HDECQ0316PJOT	R/C LED Lens
	JBTNC0109PJSA	Control Button A
	JBTNC0106PJSB	Control Button B
	JBTNP0120PJSA	Power Button
	LANGSA011WJZZ	Speaker Bracket
	LX-TZ3004CEFD	Screw for Button
	MSPRC0005PEFW	Spring (Pow But)
	XTASD40P12000	Screw
	GCABBA681WJSA	Rear Cabinet
	HINDPB508WJZZ	Indication Plate
	LX-TZ3004CEFD	Screw
	PCUSF0017PJZZ	Felt Paper
	PCUSF0028PJZZ	Felt Paper
	XTASD40P20000	Screw

Ref. No.	Part No.	Description

PACKING OF THE SET



MARK H : Not replacement items.

SHARP

I. NAKAMURA	M. GABIT	A. UGALDE	S. VERZOSA	1	
Noted	Approved	Checked	Prepared	Issue No.	Date

Received by